Unique Methods for Nation's Largest Road Job Bundle page 46

October, 1961

ROADS AND STREETS

A GILLETTE PUBLICATION

UNIVERSITY MICROFILMS
R6
EUGENE B. POWER
313 N. 1ST. ST.
ANN ARBOR, MICH.
COMP-TRA-11-50

1. JACKSON VIBRATORY COMPACTOR. On any major paving project involving the compaction of granular soils, from sand to large rock, or soil-cement mixes the JACKSON MULTIPLE VIBRATOR COMPACTOR will save its cost in jig time. It's faster in attaining 100% of specified density, more economical to operate and maintain, and has far greater job adaptability than any other machine. Each of the 6 compactor units delivers 4200 3-TON BLOWS PER MINUTE. The 4 outer units can be instantly raised for road travel or greater maneuverability around other equipment. Each compactor unit can be detached, fitted with operating handle and used as a self-propelling compactor to get into places other equipment can't reach. With side towing device no other equipment can rival it on widening operations.

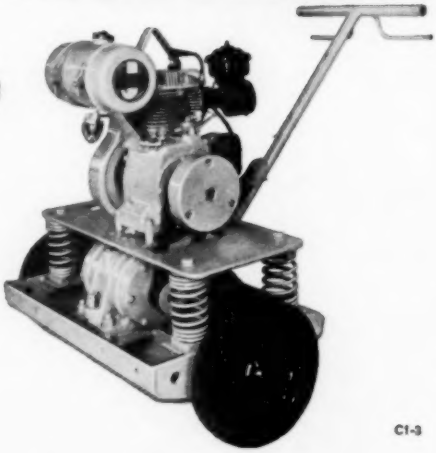
2. MUNICIPAL PAVING. For jobs of this type a JACKSON VIBRATORY SCREED and Portable Power Plant is a very convenient, productive and inexpensive outfit. Strikes off to any crown, undercuts at curbs and sideforms, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 ft. wide. Rolls back for second passes on 4 rollers.

3. JACKSON SURFACE TYPE PAVING TUBE. Equipped with very powerful vibratory motors, tremendous energy is imparted to the freshly spread concrete, puddling thoroughly even the harsh and dry mixes. The tubular bases can be supplied in the exact width to fit the job. Attaches to Spreader or Finisher.

4. JACKSON ENGINE-DRIVEN COMPACTOR. Most powerful and reliable machine of its type on the market. Delivers 4200 3-TON BLOWS per minute. 7 H.P. Wisconsin engine almost completely isolated from vibration. Adjustable vibration-free handle. Wetting device to prevent sticking of asphalt. Instantly attachable wheels for easy movement from location to location (extra). Also available with powerful single phase, 110-120 V. electric motor.

3

4



FOR SALE OR RENT AT YOUR NEARBY JACKSON DISTRIBUTOR
Name and literature on request.

JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN

C1-3

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galvanized beam guard rail

CUTS MAINTENANCE COSTS TO THE BONE

CUTS PAINTING COSTS

• While the cost for erecting is comparable to that of painted rail, the final installed cost is often *less*, due to the elimination of the painting crew.

• Galvanized rail virtually does away with maintenance, saving the high cost of periodic repaintings.

• Should it be desirable to restore reflectivity after a few years, only the exposed outer surface need be painted. The inner surfaces are still protected by the galvanizing. This greatly reduces the painting costs.

GALVANIZING ASSURES PROTECTION

• The electrochemical action of the zinc coating assures continuing protection even if part of the rail is exposed by damage.

STEEL IS STRONG AND DURABLE

• Galvanized rail will last as long as any competitive material, at lower cost, and at no sacrifice in strength.

For full details, call our nearest district sales office.

Galvanized Steel

for Strength
... Economy
... Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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ROADS AND STREETS OCTOBER, 1961

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

Industry Affairs

19 Washington Newsletter

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FRONT COVER SCENE

Granular subbase layer for an Interstate-Defense highway job in North Carolina being compacted by an equipment train consisting of an Essick 5-ton vibrating steel roller, a steel drum with circumferential fins, and a Bros 12-ton 13-tired roller, the tractor being a Case 600 diesel. Thompson Arthur Paving Co., of Greensboro, N. C., Contractor.

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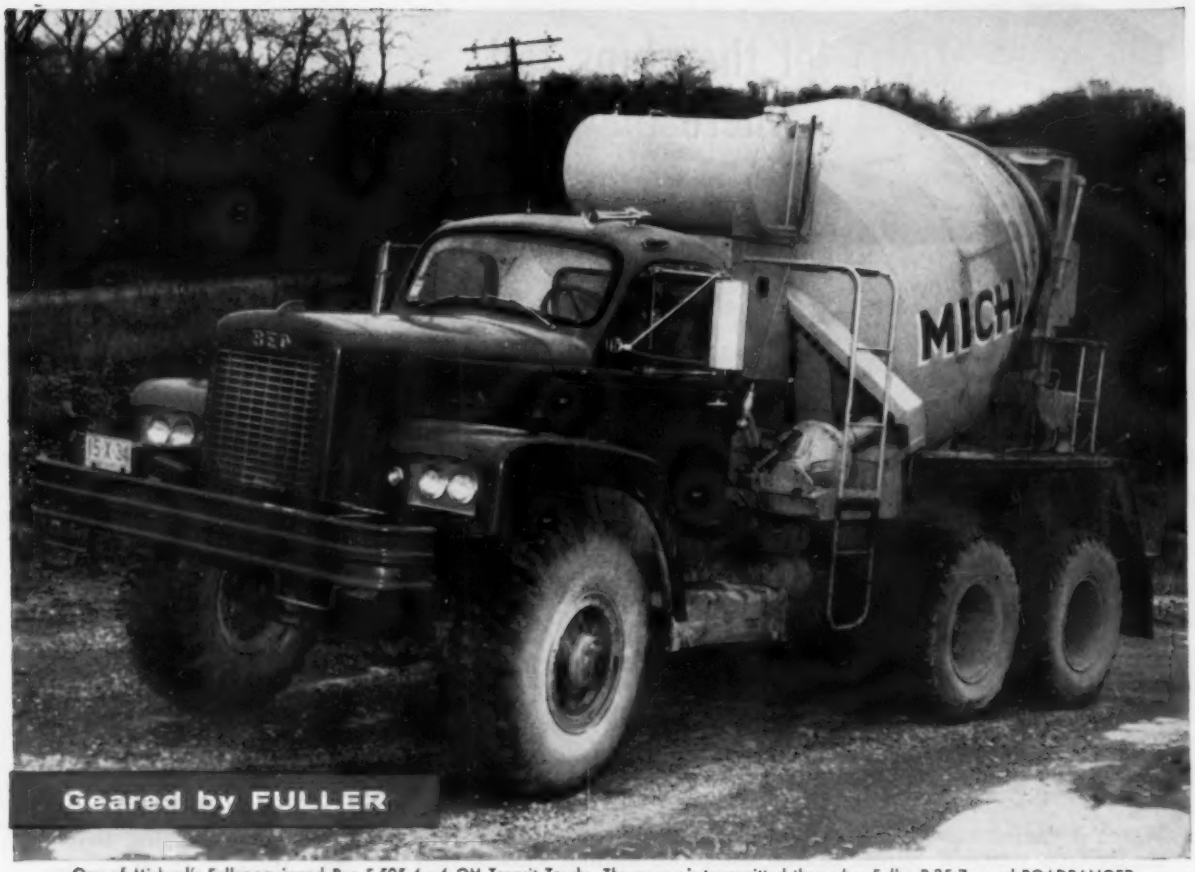

One of Michael's Fuller-equipped Reo F-505 6 x 6 OH Transit Trucks. The power is transmitted through a Fuller R-35 7-speed ROADRANGER to a 2.55:1/1.00:1 transfer case and 7.59:1 front and 7.54:1 rear axles.

R-35 ROADRANGERS from Pit to Patio

"We have more than doubled our business in the last three years," Vern Michael, owner of Michael Concrete Products, Inc., Loveland, Ohio, says. "Since we bought our first big Fuller-equipped Reo in 1957, our trucks always come through on deliveries. That Fuller R-35 ROADRANGER Transmission should be given a major portion of the credit for this performance. It has the get-up-and-go we need to get thru the rough construction sites where we operate."

Fuller R-35 RoadRanger features:

- No gear splitting — 7 selective and progressive gear ratios
- Easier, quicker shifts — closely spaced and equal ratios in the operating range
- One shift lever controls all 7 forward and 1 reverse speeds
- Engines work in peak hp range with greater fuel economy
- Compact transmission—only 375 lbs., 26-25/32 inches in length

RATIOS

Gear	Std.*	Opt.**	% Step
Seventh	1.00	1.00	*33 24**
Sixth	1.33	1.24	34.8
Fifth	1.79	1.67	34.8
Fourth	2.42	2.25	36.5
Third	3.30	3.06	48.6
Second	4.90	4.55	67.3
First	8.20	7.62	
Reverse	7.63	7.09	

Weight . . . . 375 lbs.
Oil Capacity . 16 pts.

FULLER TRANSMISSION DIVISION
EATON MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.

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MAKE EVERY CHIP COUNT WITH A

FLAHERTY SPREAD-MASTER

Watch it work for five short minutes . . . then climb aboard and take the controls yourself. Spread-Master will prove without a doubt that nothing can match it for economy or quality performance.

You'll see the savings. Chips go down smooth and tight — no need for drag boom, or to follow up with patch trucks and hand labor. Spread-Master puts the large aggregates down first, fines fall on top, in one uniform application . . . in one continuous operation. Spread-Master can produce material savings of 20% and more over other spreading methods. F101

HERE ARE SOME OF THE MACHINE FEATURES TO LOOK FOR . . .

- **Easily adjusted radial cut-off gates** — permit spreads from 6 inches to 13 feet.
- **6-Inch spread roll** — with full-width rod screen to assure uniform material flow.
- **Big capacity receiving hopper** — and two independently operated 20" conveyors carry material to spread hopper.
- **Spring-loaded truck hitch** — permits hooking and unhooking of trucks without stopping. Pulls trucks out of gear — cuts maintenance.
- **13-Ft. spread hopper** — has ample material storage for continuous spreading.
- **Five forward and reverse speeds** — with midship shuttle transmission; ample power to handle tandem-axle units.

Make the most of your spreading operation . . . go Spread-Master

Flaherty Manufacturing, Inc., Branch

BUFFALO-SPRINGFIELD CO.

Pocatello, Idaho

A Division of KOEHRING *Company*

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ROADS AND STREETS

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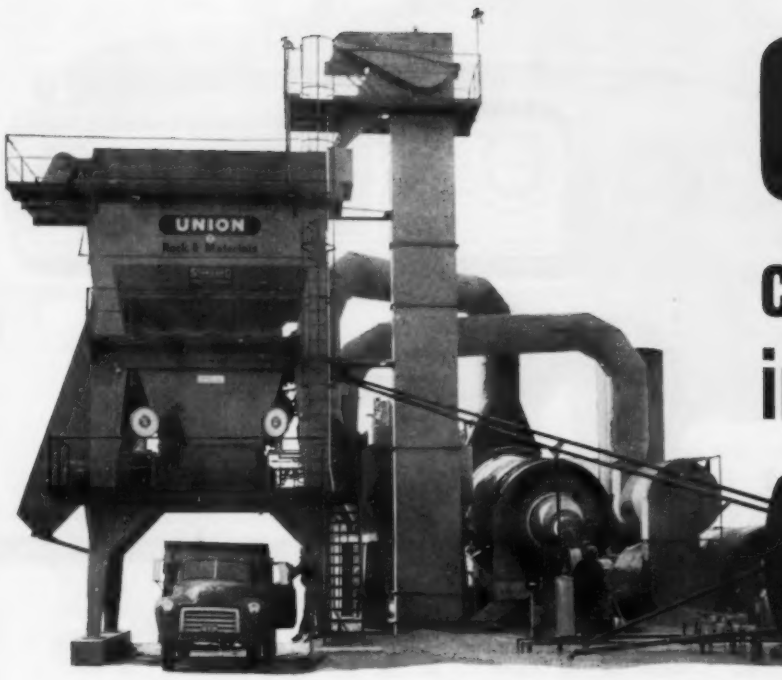


Quality costs less in the long run

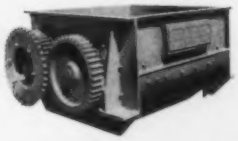
STANDARD
ASPHALT PLANTS
"The world's finest"

The STANDARD plant is the result of years of experience, proven design and careful manufacture. It produces more mix at lower cost... year after year.

SUPER-LIFT DRYER

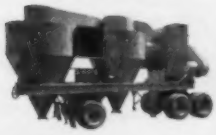
STANDARD'S exclusive saw-tooth lifters provide maximum capacity because more aggregate is exposed longer to the heated air. Entire dryer is self-contained unit with individual electric gearmotors (or diesel engine power). It features positive ring gear and pinion drive, leakproof dust seals, free floating tires, and over-sized trunnions mounted in self-aligning roller bearings.

HI-SPEED MIXER



Provides better and faster mixing action because more agitation is imparted to the mix within any given period of time. STANDARD hi-speed mixer is ruggedly built of heavy welded steel, one piece construction and is fitted with patented cast alloy liners, stuffing boxes at mixer ends, heavy duty roller bearings, many other operational cost saving features.

DUAL DUST COLLECTOR



The STANDARD twin dust collecting system provides a carefully engineered and balanced induced air system. This system, in conjunction with the generously sized dryer burner, furnishes maximum firing capability and efficiency on the dryer. This STANDARD packaged dust collector can be utilized either as a stationary or portable unit.

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100,000-MILE WARRANTY FOR SUPER DUTY V-8's

THEY'RE HERE!

NEW '62 FORD TRUCKS

Get full-time economy that only starts with Ford's low price!

Meet the trucks that make saving money a full-time business—new Ford Trucks for '62!

In a selection of over 600 models there's a truck that's right for your job, whatever your job . . . trucks that you can buy and operate at lower cost . . . trucks that can save you money mile after mile, load after load, year after year!

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FORD TRUCKS COST LESS

SAVE NOW...SAVE FROM NOW ON!

ECONOMICAL HEAVY DUTY V-8's with 292-, 302- and 332-cu. in. displacement give you tailored-to-the-job economy at much lower prices than you would expect in trucks with engines of this size. Stress-relieved cylinder heads, aluminum alloy pistons and sodium-cooled exhaust valves are but a few of the heavy-duty features you get with these engines.

EXCLUSIVE 100,000-MILE WARRANTY on 401-, 477- and 534-cu. in. Super Duty V-8's is the most liberal in the industry. Each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship. *The warranty covers full cost of replacement parts* for 100,000 miles or 24 months (or 3,000 hours if used as a power source for other than propelling the vehicle), whichever comes first . . . *full labor costs* for 50,000 miles, 12 months or 1,500 hours, sliding percentage scale thereafter.

PROVEN 262-CU. IN. BIG SIX FOR FORD MEDIUMS includes more heavy-duty engine features than any other Six of its size. Never before such long-term durability, reliability, and economy at so low a price.

NEW STYLESIDE BODY FOR 4 X 4 PICKUPS— Ford's rugged 4-wheel drive models are now available with a cab-wide Styleside box that provides over 70 cubic feet of loadspace. Flareside body with running boards is also available.

HEAVY-DUTY CAB, RADIATOR AND SHEET METAL—All Ford Tandems utilize heavy gauge steel, sturdy reinforcements and independent mounting systems to separate radiator, fenders and cab. This stronger construction, with each component individually frame-supported, gives long life, reduces maintenance expense and cuts downtime.

PRODUCTS OF Ford MOTOR COMPANY

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NO OTHER TRUCK

can power its way thru sandier, muddier going...
haul away bigger, more torturous loads...
yet stay out in front on the road so often!

This giant, diesel-powered "230" model can haul gross combination loads in excess of 100,000 lbs. Extra heavy-duty frame and front end.

INTERNATIONAL®

INTERNATIONAL gets you in and gets you out—fast: Higher average road speed of powerful, true-truck INTERNATIONAL V-8 engines cuts down trip time, picks up as many as *two extra 40-mile round trip hauls per day.* V-8's up to 257 hp; gas Sixes up to 212 hp; diesels with 695 lb.-ft. of torque and up to 262 hp.

INTERNATIONAL pulls you through the heaviest going: Newly-designed, rugged IH through-drive tandem axles handle big payloads without letting you down. Induction-hardened IH axle shafts are up to 10 times more resistant to shock loads . . . eliminate "fan out" and the possibility of fragments in the differential.

INTERNATIONAL carries bigger loads: These new lightweight IH bogies (up to 156 lb. lighter), plus heavy-duty springs and frames, give you bigger payloads, more savings in weight. Three new tandem axles now available, in 30,000, 34,000 and 38,000 lb. capacities. All three are backed by a *100,000 mile warranty!*

Nothing could be more important to an operator working on a ton-mile rate than these proven built-for-work features. See the INTERNATIONAL Truck Dealer or Branch nearest you, for your next tough job. And remember this: INTERNATIONAL has a nation-wide network of sales and service centers to keep you operating. International Harvester Company, Chicago.

Tight Schedule? Get Shipment in 24 Hours! INTERNATIONAL'S unique dump truck pool has models in popular sizes and specifications ready for shipment to you in 24 hours. Your IH Dealer is set up to handle your needs for emergency equipment. Just pick up the phone and call him.

Sure traction underneath your payload. Powerful 6-cylinder INTERNATIONAL R-line models have GVW ratings up to 53,000 lbs.

Power-geared for a more profitable operation. There isn't a tougher, more dependable V-8 built for shortening round-trip time!

TRUCKS WORLD'S MOST COMPLETE LINE

IH

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LUBE LOGIC

Tips for more

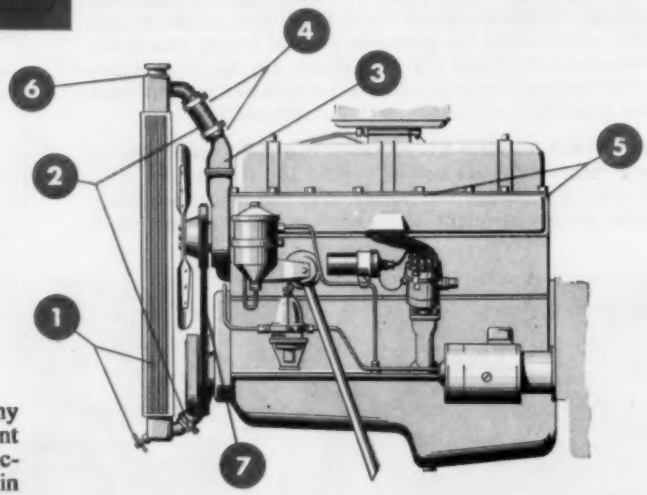
Antifreeze: what's the best type to use; how to make sure you get maximum protection

It's getting pretty close to antifreeze weather in many parts of the country, which brings up two important points: choosing the best type of antifreeze for construction machinery; and making sure the cooling system is in good condition, so the antifreeze can do its job properly.

The right type of antifreeze is the permanent kind. Construction equipment engines operate best at 180°F jacket temperature which is ten degrees higher than the boil-off point for alcohol. Permanent antifreeze (like Texaco Startex) will stay on the job at the temperature that's best for the engine. *Don't* substitute salt or kerosine solutions. They won't freeze, true enough, but they're tough on engine components.

It's important to keep the cooling system in good shape for three reasons: first, because antifreeze that gets into the crankcase causes severe varnish deposits on pistons and rings; second, because you want the antifreeze solution to circulate properly; and third, because antifreeze lost through a leak costs a lot more to replace than just plain water. Before you add antifreeze, check the following points:

1 Clean the cooling system—drain and flush thoroughly.
2 Check the radiator hoses, replace any that are soggy or collapsed.



3 Check the thermostat. If the thermostat is in good condition, the thermostat discharge connection will remain closed until the coolant in the water jacket is up to operating temperature.
4 Tighten connections on hoses that don't need replacing. Antifreeze can pass through spaces too small for water leaks.
5 Tighten cylinder head, oil cooler and other hold-down bolts.
6 Check radiator filler cap gasket.
7 Inspect and adjust fan belt.
8 Now you're ready to put in the antifreeze.

After the antifreeze is in, it's a good idea to:

1 Check the level at operating temperature.
2 Check for leaks.
3 Check water pump packing nut adjustment.
4 Check cooling solution with suitable hydrometer to make sure of protection temperature.

Metal concrete forms can be readied for re-use faster

You can get metal concrete forms cleaned up and back on the job faster if you spray them, before use, with Texaco Stazon. Use the Stazon just as it comes from the container for best results. Field reports say it gives the concrete a fine smooth finish, and the Stazon prevents sticking, shortens clean-up manhours.

Magneto Lubrication: three *IF*s and a *BUT*

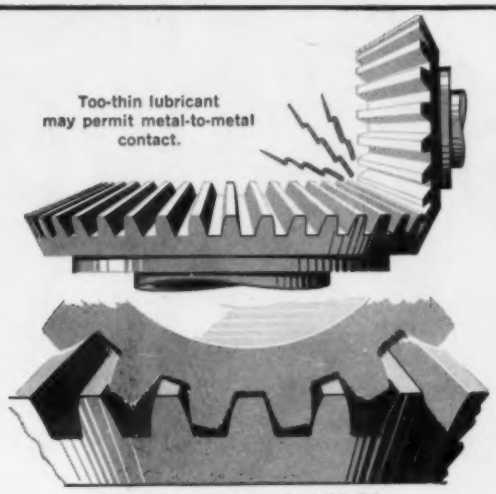
IF the magneto is oil-lubricated, apply a few drops of oil every 500 hours.

IF the magneto is grease lubricated, apply Texaco Marfak Multi Purpose 2 every 100 hours.

IF the magneto is located near the engine exhaust pipe, lubricate with Texaco High Temp Grease every 50 hours.

BUT if the bearings on your magneto are *sealed*, follow manufacturer's recommendations and let the distributor do the servicing.

efficient equipment performance



Too-thick lubricant will hold dirt,
pack in gear teeth, may damage bearings.

Key points in choosing gear lubricant for gyratory crushers

One of the toughest lube jobs on a gear-driven gyratory crusher is the gears themselves. They're partly protected by oil-tight cases and dust rings, but some contamination is inevitable, and it's essential that you choose a lubricant that can take it.

Viscosity is very important. These gears are very heavily loaded, so too-low viscosity may not provide a film thick enough to prevent metal to metal contact. On the other hand, if the lubricant is too thick, it will hold grit and dust in suspension, and let it develop a scoring action on the gear teeth. In addition, dust tends to dry out lubricants, and also creates a "packing" condition between gear teeth. This packing of dust and dried lubricant can build up undue pressure on gears and bearings.

Your best bet is a lubricant with a viscosity between 50 and 160 seconds Saybolt Universal at 210°F, with extreme pressure characteristics. These specifications will get you a lubricant with a good compromise between too thick and too thin. Ask any Texaco Lubrication Engineer to help you pick the right grade for your temperature zone.

1. PLAN FOR PROFIT—Texaco's newest color-and-sound movie. Dramatizes the major savings you can make with the proper investment of less than 1% of your total budget—the amount you spend on lubricants. Film features latest lubrication methods and equipment on a number of contracting projects, demonstrating the Texaco Simplified Lubrication Plan in action.

2. FUNDAMENTALS OF LUBRICATION—a brand new Texaco color slide film. A clear, concise once-over that defines technical terms like "viscosity" and explains specifically what lubrication is and what it does. This down-to-earth discussion will give the lubrication man a new understanding of the importance of lubrication, and a fresh interest in his work. It's supplemented with a manual that covers the same ground in greater detail.

3. LUBRICATION OF EARTHMOVING EQUIPMENT—a new slide film, in color. A concise, easy-to-understand analysis of proper lubrication of engines, wheel bearings, steering, track rollers, crawler treads, hydraulic equipment, wire rope, open and enclosed gears. Supplemented with a manual that covers the whole field of earthmoving equipment lubrication in greater detail.

FOR AN EARLY SHOWING of any one of these films—or all of them—contact your Texaco Contractor Representative *now*.

TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers," little angles, so easy to overlook, where big savings in time and money can be made. If Lube Logic doesn't solve your problems, call your local Texaco man. Anytime, all the time, he's your best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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TEXACO

Throughout the United States
Canada • Latin America • West Africa

B.F.GOODRICH TIRES MOVE ROCK FILL FOR COUGAR DAM.
Finished dam will tower 485 feet, stretch 1,600 feet, and slope from a base width of 1,500 feet to a crest width of 40 feet.
Six-mile reservoir will provide water resources for flood control, power production and public recreation. $50-million project is scheduled to take four years.

30 TONS OF ROCK CRASH onto B.F.Goodrich Rock Service tires. Tires work two shifts a day on scrapers, bottom dumps, rear dumps, water wagons, graders, rollers and mobile cranes. Yet it's not unusual for tires to be retreaded twice.

CONTINUOUS TIRE INSPECTIONS play a key role in keeping M-C&S' equipment on the go. The B.F.Goodrich Unified Contractors Program helps contractors save on all their rubber products—and protective clothing—requirements. Ask your BFG dealer to show you how this new program can help *you*.

B.F.Goodrich helps move a mountain to build a dam

B.F.GOODRICH ON-THE-SPOT SERVICE helps M-C&S get the most out of equipment. Tire changes seldom take longer than 15 minutes. BFG Servicemobiles carry all the latest power tools, are manned by tire experts.

12-MILLION CUBIC YARDS OF ROCK AND EARTH FILL RIDE TO $50-MILLION COUGAR DAM PROJECT ON B.F.GOODRICH TIRES

They're changing the topography of Oregon's Willamette Valley. Rock quarried from a knob high above the South Fork McKenzie River is taxied down a tortuous road by a fleet of giant earth movers. It will become part of the fill for Cougar Dam, a Corps of Engineers flood control project that will be the largest structure of its type in the Northwest.

Altogether, general contractor Merritt-Chapman & Scott Corp. will move 12-million cubic yards—every one on B.F.Goodrich tires. You'll find B.F.Goodrich Rock Service tires with Cut Protected compound hard at work here. BFG developed this compound for jobs like Cougar Dam, where upwards of 30-ton loads must be carried over hard, rock-surfaced roads. It takes a mighty big boulder to gash this compound, and if it should, there's BFG Flex-Rite Nylon cord construction to withstand the impact (and resist heat blowouts and flex breaks too). No wonder many Rock Service tires at Cougar Dam can be retreaded twice.

B.F.Goodrich on-the-job service plays a key role in keeping M-C&S equipment on the go. All 600 BFG tires are inspected regularly. Tire changes seldom take longer than 15 minutes. There is a BFG tire warehouse and shop less than a mile from the project. A BFG tire record system keeps the contractor informed of costs and helps control inventory.

Supplying contractors with longer-wearing tires and dollar-saving service is an everyday job for B.F.Goodrich. On many projects B.F.Goodrich supplies everything from tires to boots to belts through its new Unified Contractors Program. Whatever *your* need, it will pay you to talk to your B.F.Goodrich dealer. His know-how can make a big difference in your profit picture. Look him up under Tires in the Yellow Pages. *The B.F.Goodrich Company, Akron 18, Ohio.*

Specify **B.F.Goodrich Tubeless or tube-type tires when ordering new equipment**

B.F.Goodrich

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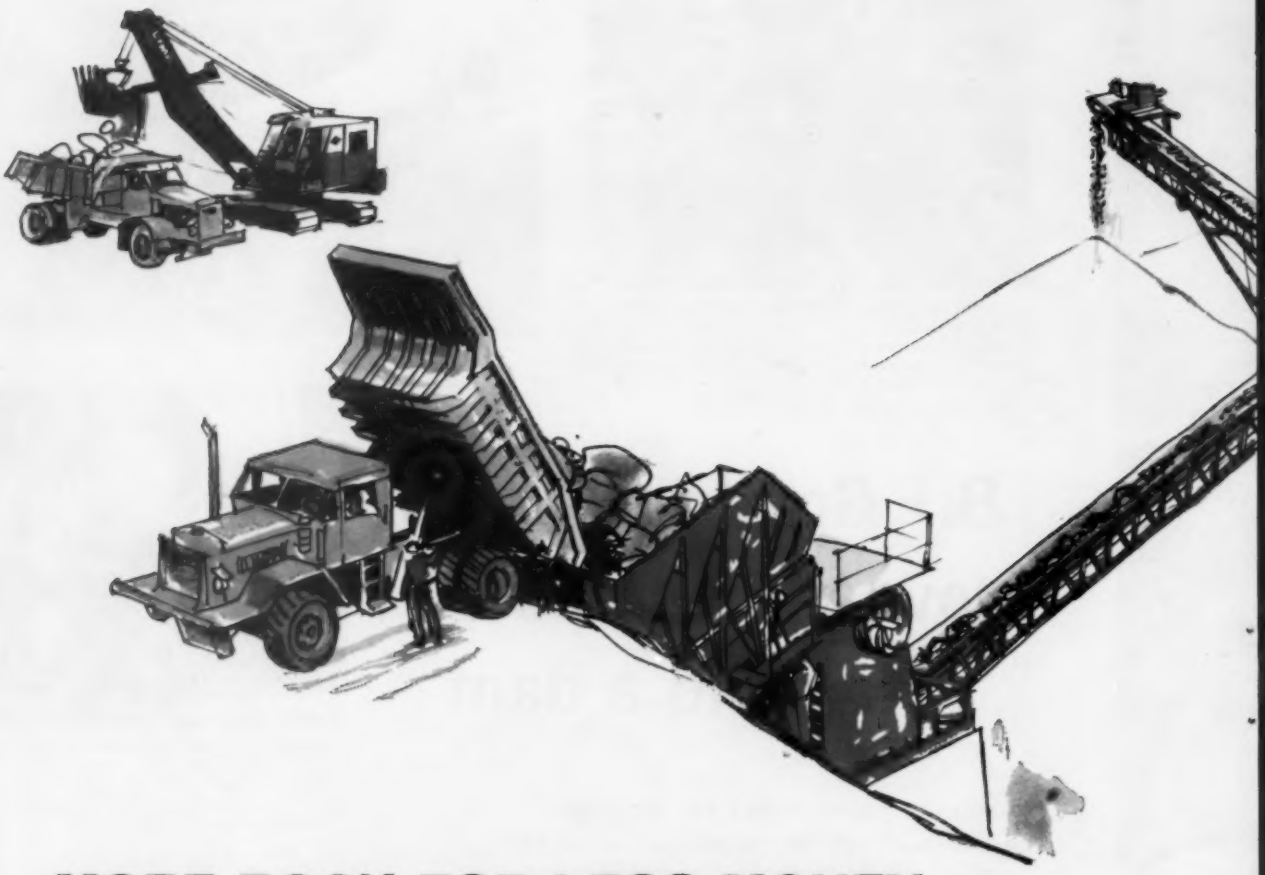
THE USEFULNESS OF A ***LIMA AUSTIN-WESTERN***



MORE ROCK FOR LESS MONEY . . .

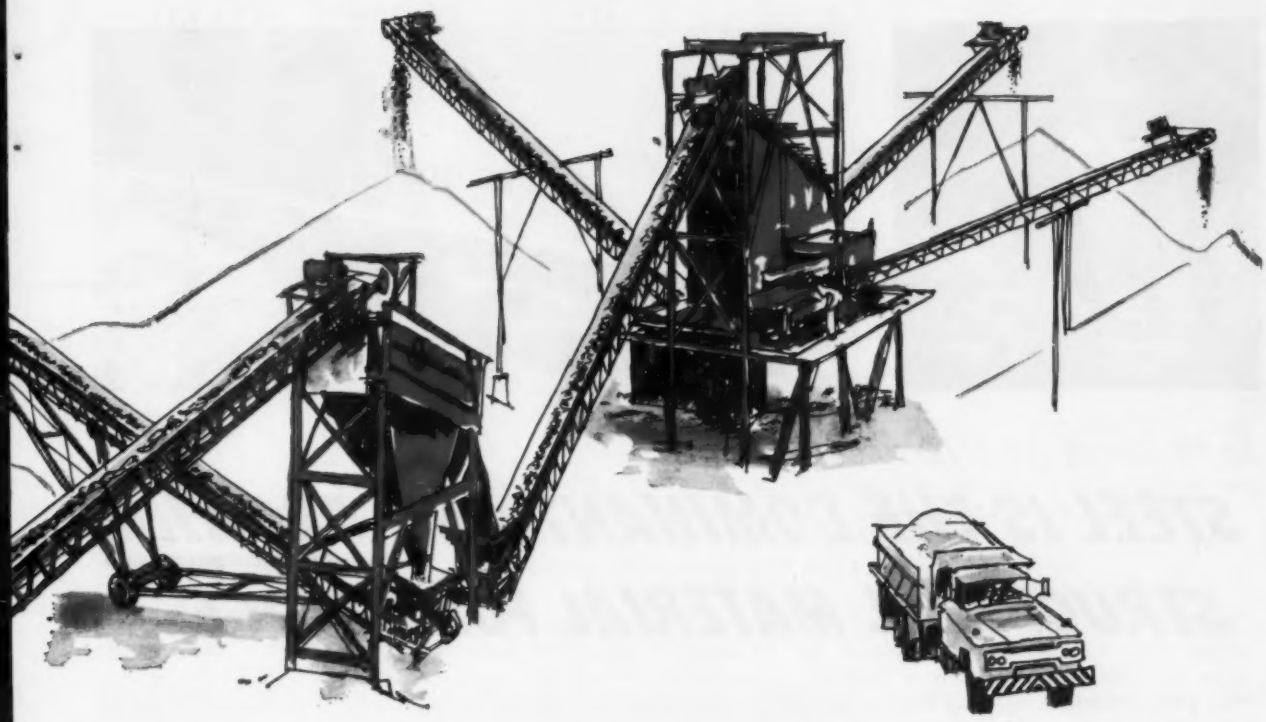
More for less, of anything, is a rarity today. But you can get it with a Lima Austin-Western stationary crushing installation like this, because it is a high-speed, big-output operation from start to finish. It can be custom engineered for a specific operation—*such as yours!*

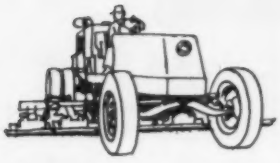
High performance is possible because only the finest materials are used—such as antifriction roller bearings and many special-strength alloy steels scientifically checked for structural perfection. Years of manufacturing experience have produced highly refined designs which eliminate many troublesome shafts, gears, sprockets, clutches, chains and belts. Deep crusher jaws with long, smooth stroke assure dependably high production—more yards per hour, lower cost per yard.

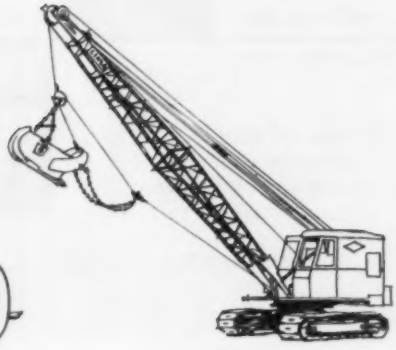
The Lima Austin-Western line includes many sizes of jaw and roll crushers, matching screens, elevators, feeders, conveyors and bins. Portable Lima Austin-Western crushing plants are available in various models to fit your exact requirements.

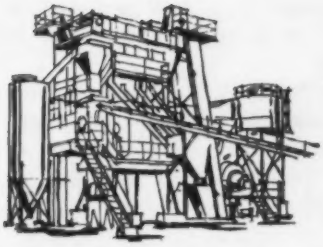
Ask us now for facts and figures on the profit-producing performance of our crushing, screening and washing equipment.

6125









LIMA MODEL D ROADPACKER
—Six vibrating shoes compact fast and deep for profitable single-course construction; available in 12-shoe Super model.

LIMA SHOVELS AND CRANES
—Interchangeable front ends. Shovels to 8 yd.; cranes to 140 tons on crawlers, 80 tons on rubber; draglines variable.

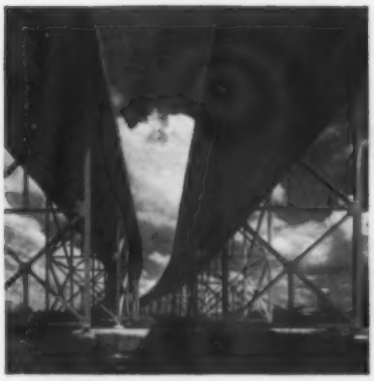
LIMA MADSEN ASPHALT PLANTS
—available in models with batching capacities from 1000 to 10,000 lb.

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

...for more details circle 286 on enclosed return postal card



LET'S LOOK AT THE FACTS...

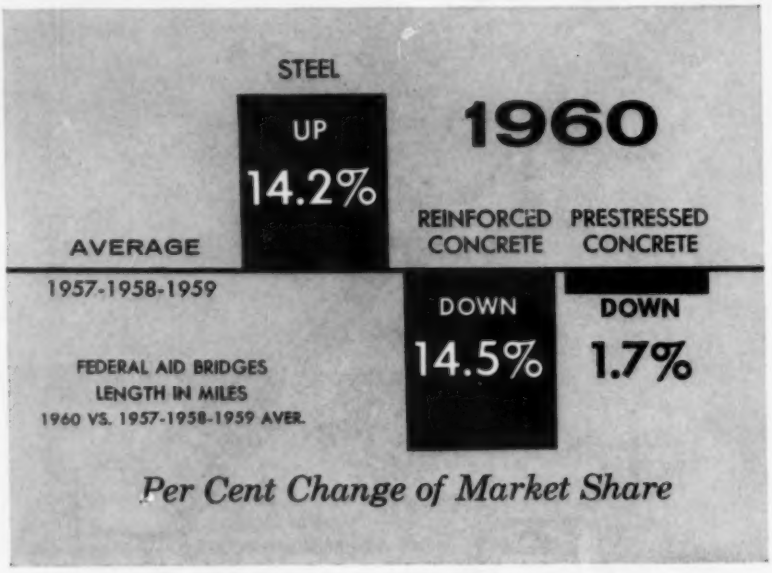
STEEL IS THE DOMINANT AND GROWING STRUCTURAL MATERIAL FOR BRIDGES!

Only *steel* increased its market share of federal aid highway bridges in 1960, compared to the three-year average of 1957-58-59, in terms of *total length of bridges authorized.*

Steel's percentage *increased* from 45.2 per cent of the total bridge length in 1957-58-59 to 51.6 per cent in 1960.

Reinforced concrete's percentage of total bridge length *decreased* from 42.9 per cent in 1957-58-59 to 36.7 per cent in 1960.

Prestressed concrete's percentage of total bridge length *decreased* from 11.9 per cent in 1957-58-59 to 11.7 per cent in 1960.



Good reasons for steel's increased use...

Steel is strong. Reliable. Versatile. Adaptable. And economical. Design your next bridge with steel; build it with steel. You'll find that steel makes sense. American Institute of Steel Construction, N. Y. 17.

Steel **STANDS** *for the future* AISC

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ROADS AND STREETS

Sixty-Nine years of Editorial Leadership

Washington News Letter

By Duane L. Cronk, Director, Highway Information Services

October 10, 1961

Pressure to get more federal construction work into the hands of subcontractors has been quietly building up here. Last month just before adjournment, Congress OK'd an amendment to the Small Business Act which would require agencies to give greater consideration to contractors employing the most subcontractors.

The Small Business Administration is continually looking over the shoulder of the Bureau of Public Roads and frequently asks it to document its claims that small contractors are getting enough of the federal-aid highway pie already. Unlike some federal agencies, the BPR believes that too much "brokerage" would be bad for the roadbuilding program, and it defends aggressively the 50% limitation on subcontracting on highway jobs.

Some contractor members of both the American Road Builders Association and the Associated General Contractors of America don't like this restriction, would like to see it softened to 75%. Last month, ARBA's Contractor Division asked that organization to investigate the merits of such a policy change, and it is likely that the organization will poll its members on the subject. AGC is standing pat.

* * *

First report on the AASHO Road Test has been issued. A series of seven publications revealing findings of the big $27 million research project will be released by the Highway Research Board during the next six months.

HRB is making it clear to the engineering press that any interpretation of the data, particularly in respect to the effect of various loads on various pavement designs, portland cement and asphalt, will be made by American Association of State Highway Officials, the sponsoring organization. AASHO, in turn, reports that its interpretations of the Road Test findings will be only after considerable committee discussion and will be incorporated in revisions of its policies on design and sizes and weights. They will be forthcoming next summer.

* * *

Fighting fire with fire: The BPR has decided to get into the investigating business with both feet. The federal agency has been under attack repeatedly during the last couple of years for inadequate control over Interstate construction practices and right-of-way acquisition. Last month, Federal Highway Administrator Rex Whitton hired five investigators of his own, four of them former FBI men (with a collective total of 45 years experience in this specialized profession).

Primary responsibility of the new officials will be to probe any "known or possible" irregularities in the Federal-Aid Highway Program. Each will cover a specific area, operating under the title "Regional Program Evaluation Officer."

(continued on next page)

A $225,000 expansion program for the Highway Research Board was kicked off last month. The Board's staff and facilities for exchange of research ideas and findings have become grossly over-burdened. And the demand for more of HRB's nationwide correlation service has out-run the current budget.

The 50 state highway departments have agreed to put up $100,000 for a proposed expansion program and the BPR will contribute another $25,000. To make it possible for highway industries to participate in the drive for the remaining $100,000, the Board plans to create a new Industrial Associate membership. A number of manufacturers of equipment and materials whose research staffs have benefitted heavily from the Board's activities and publications are expected to support the expansion program.

The fracas over inflated right-of-way costs in his and other states has led a Massachusetts Senator to introduce two bills which would put Uncle Sam very much into the appraisal procedure. One would enable the U.S. Department of Justice to help expedite condemnation of property on proposed highway locations. The other would permit Justice to make independent appraisals of right-of-way (and preliminary engineering costs). The idea is that if the state's appraisals are too high, the federal government should declare it will participate only to the extent of its own estimates.

The measure will infuriate state highway officials. Congress adjourned without action on the bills, but the sponsor says he will be back with them next session.

* * *

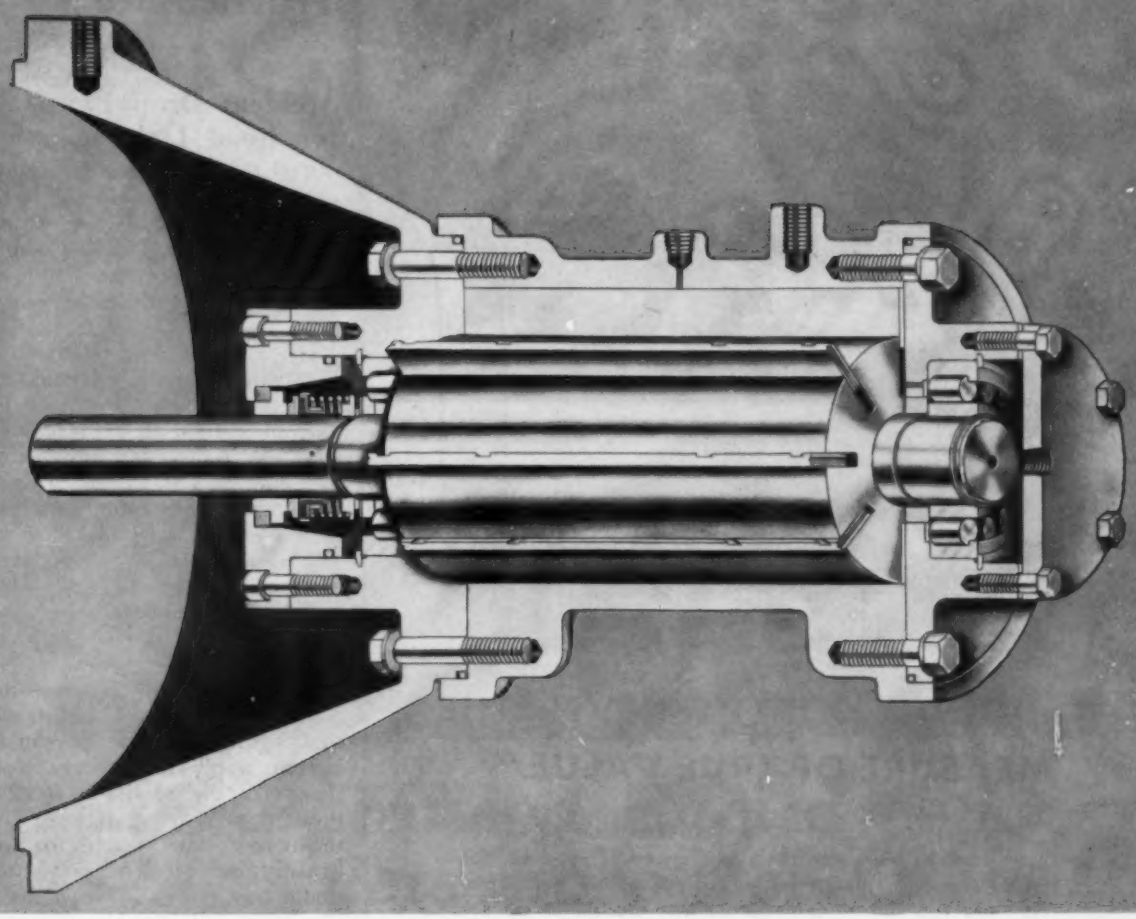
Meanwhile, Congressmen are getting a personal insight into local congestion and the high cost of highway improvements. Traffic on the much-touted Shirley Highway into Washington, D. C., from Virginia has become almost intolerable. Congressmen who use the route to get to and from work shuddered at the high cost of widening the limited access road, but they approved the big project for 95% federal participation. The tab, for widening a 4-mile stretch of Shirley, two lanes on each side, and reconstructing interchanges, may hit $19 million.

About three times during the last decade, the Highway Research Board has produced a "best seller," a technical publication selling more than 4,500 copies. This month, HRB Director Fred Burggraf confidently predicted that a newly released book on compaction will hit the "best seller" list. The source book, a veritable gold mine of data and procedures on field compaction of earthwork, subbase and bases, has nearly outsold its first printing. Interestingly, one of the previous two best sellers (in 1952) was a similar piece of work.

The BPR is revising its base for computing the "Highway Construction Bid Price Index." For almost 30 years, the bid price index has been the federal government's standard for determining the trends, up and down, of roadbuilding costs. During all that time, it has been based on the period of prices in 1925-1929.

The new price index base will reflect some major changes. For example, the 30 major bid items used heretofore in computing the index of construction costs did not directly include bituminous pavement; quantities per mile have differed widely; and the geographic distribution of work has changed considerably since 1925-29. Starting in 1962, the new index will include both portland cement and bituminous concrete as indicators, and nationwide total quantities of materials will be used, instead of the per-mile quantities of the old base.

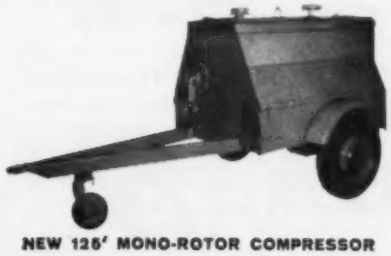
WORTHINGTON COMPRESSOR NEWS:



NEW MONO-ROTOR INTRODUCED IN 85′, 125′ AND 250′ MODELS

Now Worthington introduces the new Mono-Rotor Blue Brute compressor—a significant step ahead in improving compressor performance. The Mono-Rotor introduction follows six full years of development and field testing. It can be ordered immediately in the most commonly used sizes.

The major feature of the Mono-Rotor design is its extremely simple, dependable construction. The Mono-Rotor is built with just one stage . . . just one rotor . . . just two bearings . . . no gears . . . oil pump.



NEW 125′ MONO-ROTOR COMPRESSOR

It is simpler in construction than any two stage compressor or any screw type compressor. This simple construction is the basis of its high degree of reliability.

How reliable is the Mono-Rotor? Its reliability is so great that Worthington has quadrupled its warranty period. The standard warranty agreement has been extended from the usual 90 days to one full year. Worthington is the first compressor manufacturer supplying the construction industry to do so.

What makes the new Mono-Rotor design so successful? It is the new Worthington-developed rotor-to-cylinder sealing. For over ten years the industry has attempted to solve this problem for larger compressor sizes. Two-stage construction was the solution until Worthington developed new methods of oil distribution within the cylinder. Now an efficient, dependable air supply is available in just one stage—one rotor construction.

The new Worthington Mono-Rotor units have other benefits, too. They are 20% lighter in weight and are designed for improved towing and tracking. The third wheel is standard equipment for easier handling on the job. There is an engine-saving clutch and many other features.

The Mono-Rotor Blue Brute can now be ordered in the 85′, 125′ and 250′ sizes. See it . . . rent it . . . or buy it at your Worthington dealer listed in the Yellow Pages under "Compressors." Or write Worthington Corporation, Dept. 60-37, Holyoke, Mass. In Canada: Worthington (Canada) Ltd., Brantford, Ontario.

WORTHINGTON

PRODUCTS THAT WORK FOR YOUR PROFIT

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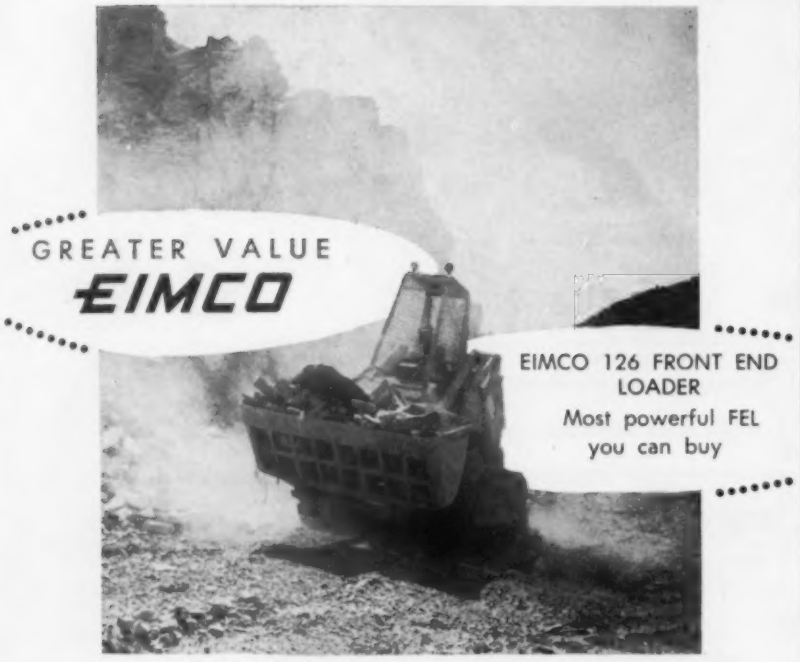

"ORIGINAL COST IS NEVER THE MEASURE OF TRUE VALUE."

For real and sound value, you can't beat an Eimco. Every unit is very competitively priced. This does not mean however, that it is impossible to buy a cheaper crawler. You might. But, before you decide to do so, check all the vital product and construction features. Check value, not just the price alone.

If you do, you will agree that the built-in reserves . . . in strength, capacity, reliability, parts and service availability . . . plus Eimco's superior working and production features, make an Eimco crawler the greatest value on the market anywhere.

Eimco Bulldozers, Front End Loaders, Excavators, Log Loaders and Special Steel Mill Loaders—122 HP to 225 HP diesel powered—are designed, engineered and produced by one of the largest . . . and most completly integrated and reliable . . . manufacturing complexes in the United States. Every Eimco is backed by over seventy-six years experience in the building of heavy-duty underground rock loading equipment, by the worlds largest and pioneer producer, a heritage that is immediately apparent in the sound, solid, tough construction of every Eimco crawler unit.

Before you buy, get all the facts. See a demonstration. Write to The Eimco Corporation, Salt Lake City 10, Utah, U.S.A. for the address of your nearby Eimco Dealer or Branch and for Bulletins LS-1174/75.

EIMCO

B-800 "Advanced Engineering and Quality Craftsmanship Since 1884"

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Traffic Safety

Accident Drop Pays for Road Lighting

The lighting of critical sections of highways is fully justified by the night accidents it prevents, according to new findings of the Committee on Highway Illumination of American Road Builders Association.

Herbert A. Friede, chairman of the committee, reports Connecticut studies that show 85 percent reduction of night accidents on highways and 60 percent in urban areas where lighting is adequate. Latest estimate of the economic loss from the average traffic accident is $5,734 where fatality is involved, $1,394 with injury and $328 when only property damage is involved.

Highway officials now have reliable statistics on which to base decisions with respect to lighting, according to Friede. They can take their figures for night accident locations, apply the average costs, then take the 85 or 60 accident prevent percentage and see for themselves how much roadway lighting the accident prevention would buy.

Better Signals Cut Intersection Accidents

A 56 percent reduction in accidents and a 63 percent reduction in injuries followed modernization of traffic lights at a Michigan arterial junction. The location is at US 25 and 15 Mile Road north of St. Clair Shores, a Detroit suburb. A study by the state highway department here showed 27 persons injured in 34 accidents before revamping the signals in October of 1959; compared with ten persons injured in 15 accidents in a 12-month following period.

Night Sign Check-Up

The Road signs and reflector buttons in service in the Texas highway system are being inspected systematically by travelling the roads at night. In a six-month period, 569 signs and 3,549 buttons were replaced in a single district.

Better Balanced Euclid C-6 gets more work done!

Owners of the "Euc" C-6 report that it's the best balanced tractor in the 200 h.p. class. Low center of gravity and close mounting of blades made possible by a rear-mounted radiator eliminate "nosing down" in heavy dozing work. The C-6 works easily on slopes where other crawlers can't be used because they won't hold on . . . and lower ground pressures let the "Euc" work in soft going that stops competitive tractors.

You've really got to see a C-6 at work to know what its excellent balance means in performance and productive capacity . . . your Euclid dealer will make arrangements, so get in touch with him soon.

C-6 *. . . lowest cost crawler in the 200 h.p. class . . . and most versatile by far!*

GM GENERAL MOTORS EUCLID

EUCLID

DIVISION OF GENERAL MOTORS, HUDSON, OHIO

Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

BIG, NEW, EXTRA-TOUGH DOZERS BOOST DIRT YARDAGE

Take full advantage of Allis-Chalmers tractor power with the new line of heavier, tougher, straight, U and semi-U blade dozers and angling-type dozers. Extra-heavy-duty cutting edges and end bits, extra moldboard height give you bigger loads, extra strength throughout.

Whatever the right-of-way—trees, brush, rock, swamp, hills, gulleys—Allis-Chalmers can offer you the right tractor-dozer combination to meet the condition . . . hydraulic or cable-controlled; full U blade, wide or narrow semi-U blade; straight blade; hydraulic tilt dozer; cable- and hydraulic-type angling dozers; plus interchangeable dirt points and rock points.

Each dozer is designed to take full advantage of the power, strength and balance built into the tractor to give you big production yardage. Dozers are built for greater strength, flexibility and bigger output with higher, stronger, more rigid moldboards; bigger, heavier cutting edges and end bits; forged steel, ball-type push-beam trunnions; and extra-tough custom-rolled, special alloy steel C frames and push-beams.

New long-life, triple-valve hydraulic system for the HD-21 gives you positive control of blade lifting, lowering and tilting, and ripper lifting and lowering.

Compare Allis-Chalmers tractors with any other on major features. Inspect Allis-Chalmers tractor undercarriage; the healthy fuel-miser engine; all-steel main frame; double-reduction final drives; the industry's toughest track, and many other cost-cutting features. Then get convincing proof with a demonstration from your Allis-Chalmers dealer. *Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.*

NEW F-100 FRONT-MOUNTED CABLE CONTROL UNIT ▶

New cool-running, sure-acting cable control unit is the only fully sealed, fully anti-friction bearing unit in the industry. Brake drums, bands and planetary gears run in a bath of oil. It has already recorded new standards for exceptionally long life.

STEP UP YOUR

Performance
Operator comfort
Wearability
Ease of maintenance
Reliability

WITH **ALLIS-CHALMERS**
POWER FOR A GROWING WORLD

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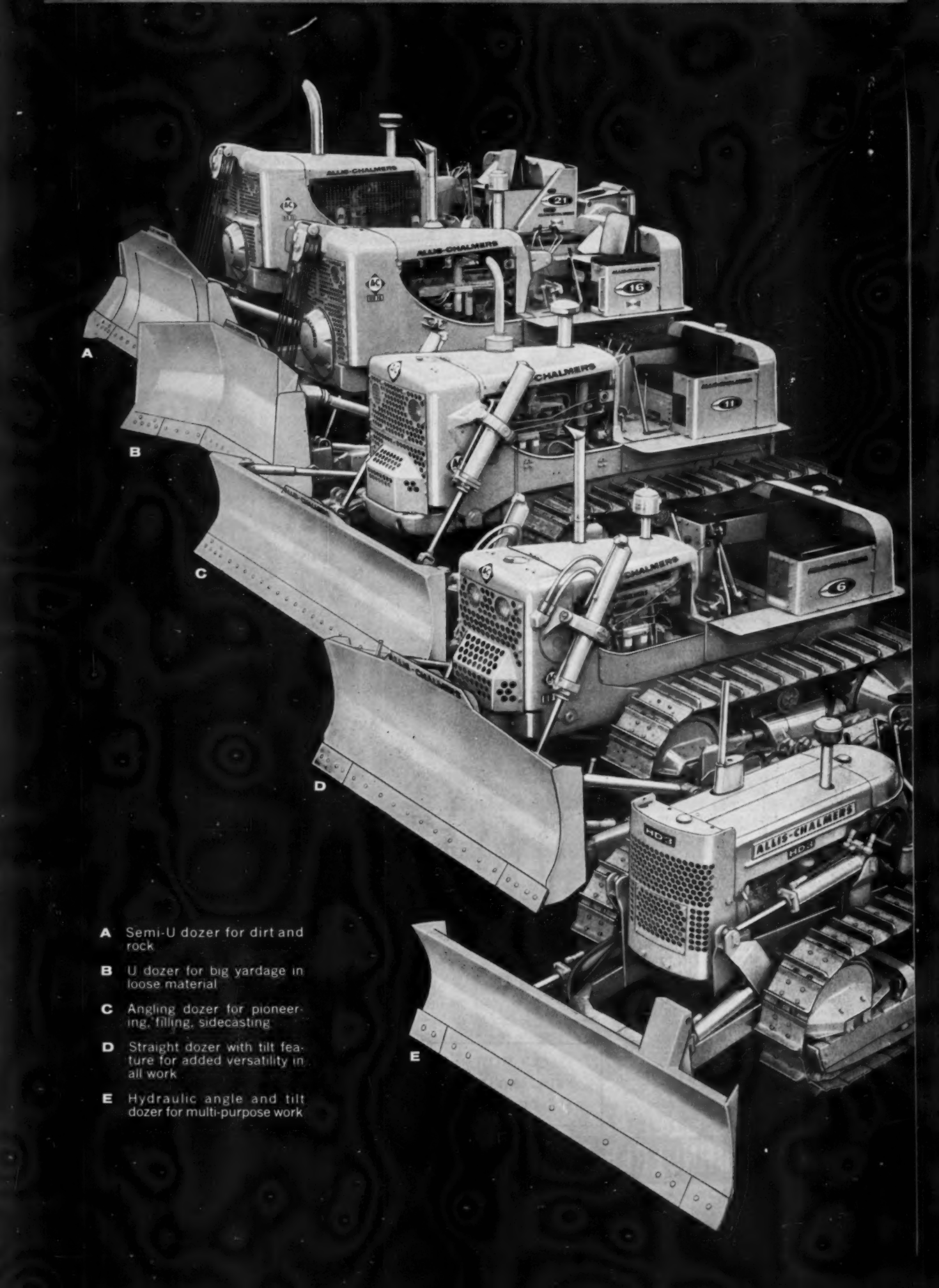


A Semi-U dozer for dirt and rock

B U dozer for big yardage in loose material

C Angling dozer for pioneering, filling, sidecasting

D Straight dozer with tilt feature for added versatility in all work

E Hydraulic angle and tilt dozer for multi-purpose work

Meetings

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—47th Annual Convention, Denver Hilton Hotel, Denver, Colorado; October 9-13.

AMERICAN SOCIETY OF CIVIL ENGINEERS—National Convention, Statler Hotel, New York, N.Y.; October 16-20.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA—Midyear Meeting of Governing and Advisory Boards, Roosevelt Hotel, New Orleans, La.; October 23-25.

AMERICAN SOCIETY FOR TESTING MATERIALS—5th Pacific Area National Meeting, Olympic Hotel, Seattle, Wash.; October 31 - November 5.

AMERICAN CONCRETE INSTITUTE—14th Regional Meeting, Dinkler-Tutwiler Hotel, Birmingham, Alabama; November 1-3.

AMERICAN BRIDGE, TUNNEL AND TURNPIKE ASSOCIATION, INC.—Annual Convention, Bellevue-Stratford Hotel, Philadelphia, Penn.; November 12-17.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS—Annual Meeting, Hotel Marion, Little Rock, Arkansas; November 27-30.

THE ASPHALT INSTITUTE—Annual Meeting, Shoreham Hotel, Washington, D.C.; December 4-7.

HIGHWAY RESEARCH BOARD—Annual Meeting, Sheraton Park Hotel, Washington, D.C.; January 8-12, 1962.

NATIONAL LIMESTONE INSTITUTE—Annual Winter Meeting, Roney Plaza Hotel, Miami Beach, Fla.; January 15-19.

ASSOCIATED EQUIPMENT DISTRIBUTORS—Annual Convention, Conrad Hilton Hotel, Chicago, Ill.; January 28-February 1.

ASSOCIATION OF ASPHALT PAVING TECHNOLOGISTS—Annual Meeting, Sheraton Charles Hotel, New Orleans, Louisiana; January 29-31.

NATIONAL READY-MIXED CONCRETE ASSOCIATION—Convention and Biennial Equipment Show, McCormick Place, Chicago, Ill.; February 5-9.

NATIONAL CRUSHED STONE ASSOCIATION—Annual Convention and Exposition, Conrad Hilton Hotel, Chicago, Ill.; February 11-15.

NATIONAL BITUMINOUS CONCRETE ASSOCIATION—Annual Convention, Flamingo Hotel, Las Vegas, Nevada; February 17-22.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.—Annual Convention, Biltimore Hotel, Los Angeles, Calif.; February 26-March 1.

AMERICAN ROAD BUILDERS ASSOCIATION—60th Annual Meeting and 8th Annual Highway Materials and Services Exhibit, Sheraton-Place Hotel, San Francisco, Calif.; March 4-7.

AMERICAN CONCRETE INSTITUTE—58th Annual Convention, Brown Palace Hotel, Denver, Colo.; March 12-15.

NOW! A Time Saving Device for Precision Grading

THE BASIC PRINCIPAL OF THE ABERDEEN GRADER STABILIZER

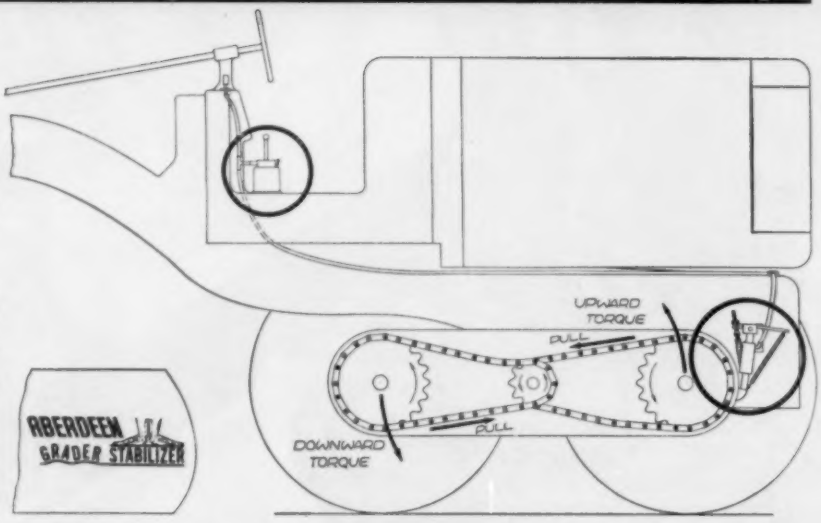
All people acquainted with tandem axle motor graders know that the front tires of the tandem wear faster than the rear tires.

The torque of the power train pulls the front wheel down and raises the rear wheel up as illustrated above.

We are offsetting this torque with the ABERDEEN GRADER STABILIZER, thus increasing the traction 38 to 42%. At the same time we are stabilizing the machine and attaining greater speeds whether maintaining, laying base, blacktop, or finishing dirt grade.

U. R. Molseed, Assistant District Engineer, South Dakota Department of Highways, says the installation of these ABERDEEN GRADER STABILIZERS on a motor grader has definitely improved grade line, rideability, and uniform depth of laydown.

PROVEN IN ACTUAL USE. One of the greatest patented improvements on a motor grader for many years.



SOLD WITH FULL MONEY BACK GUARANTEE

ONLY **$295.00** READY TO INSTALL
(price subject to change)

Ask your local Distributor, or write direct to factory.

A. W. SCHNUERLE MANUFACTURING CO. PHONE: BAldwin 5-8300 ABERDEEN, SOUTH DAKOTA

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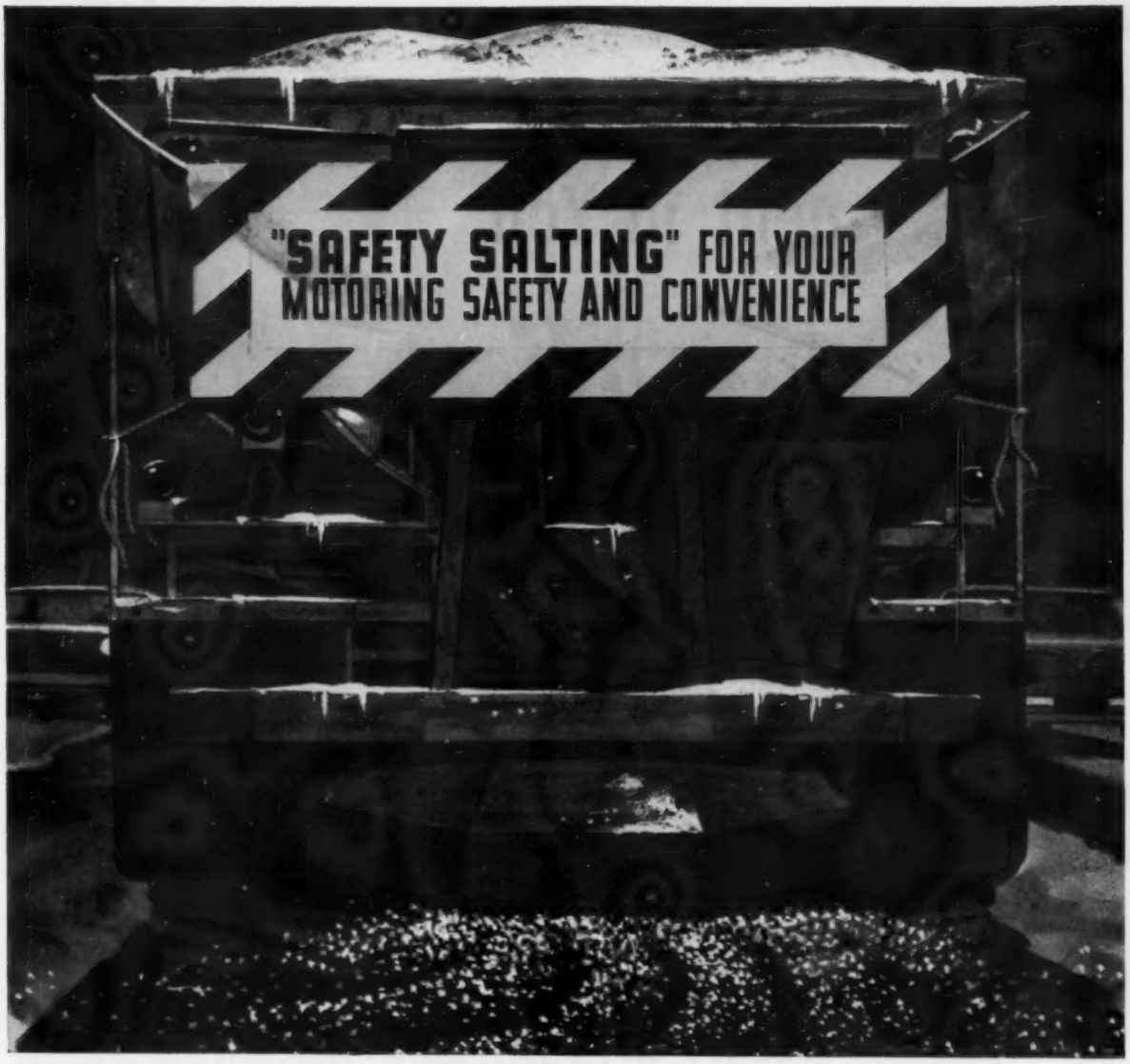

NOW! An ice control program that cuts accidents and complaints!

The Morton Safe-T-Salt* Ice Control Program can help you accomplish two important jobs this winter . . . public safety and public relations!

Streets are safer when they are salted with Safe-T-Salt, because it is a screened and graded rock salt that gets rid of dangerous ice and snow in the quickest, safest, most economical way possible.

The name "Safe-T-Salt" was developed to explain this job to the public. As you know, too many uninformed citizens complain about de-icing programs every winter. The "Safe-T-Salt" name will cut down those complaints by emphasizing the safety value of salting treacherous pavements . . . will keep the public aware of your efforts to reduce winter driving hazards.

The truck banner in the illustration above represents one way that safety salting can be made popular. These banners are available free to Morton Salt customers. Your Morton representative can supply them and other material . . . as well as furnishing you with helpful publicity features for your local newspapers, explaining the value of de-icing programs. He'll be glad to help you start planning *now* for a safer and happier winter.

FOR MORE INFORMATION ON MORTON SAFE-T-SALT, MAIL THIS COUPON TODAY

Please have a Morton Salt representative call me for an appointment to explain all the advantages of your Safe-T-Salt program.

Name_____

Title_____

Address_____

City_____ Zone_____ State_____

MORTON SALT COMPANY

INDUSTRIAL DIVISION

Dept. RS10, 110 N. Wacker Drive, Chicago 6, Ill.

*Safe-T-Salt is a trademark of the Morton Salt Company

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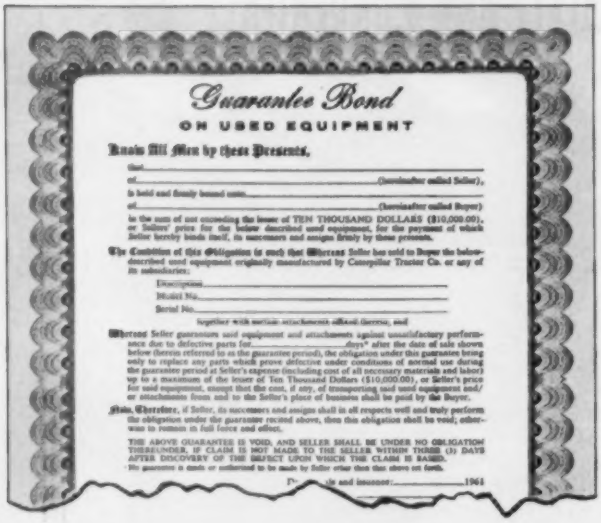
This Bond Is an Investment in You



Guarantee Bond

ON USED EQUIPMENT

Know All Men by these Presents,

that _____

of _____ (hereinafter called Seller),

is held and firmly bound unto _____

of _____ (hereinafter called Buyer)

in the sum of not exceeding the lesser of TEN THOUSAND DOLLARS ($10,000.00), or Buyers' price for the below described used equipment, for the payment of which Seller hereby binds itself, its successors and assigns firmly by these presents.

The Condition of this Obligation is such that Whereas Seller has sold to Buyer the below-described used equipment originally manufactured by Caterpillar Tractor Co. or any of its subsidiaries:

Description _____

Model No. _____

Serial No. _____

together with serviceattachments offered thereto, and

Whereas Seller guarantees said equipment and attachments against unsatisfactory performance due to defective parts for _____ days* after the date of sale shown below (herein referred to as the guarantee period), the obligation under this guarantee being only to replace any parts which prove defective under conditions of normal use during the guarantee period at Seller's expense (including cost of all necessary materials and labor) up to a maximum of the lesser of Ten Thousand Dollars ($10,000.00), or Seller's price for said equipment, except that the cost, if any, of transporting said used equipment and/or attachments from and to the Seller's place of business shall be paid by the Buyer.

Now, Therefore, if Seller, its successors and assigns shall in all respects well and truly perform the obligation under the guarantee recited above, then this obligation shall be void; otherwise to remain in full force and effect.

THE ABOVE GUARANTEE IS VOID, AND SELLER SHALL BE UNDER NO OBLIGATION THEREUNDER, IF CLAIM IS NOT MADE TO THE SELLER WITHIN THREE (3) DAYS AFTER DISCOVERY OF THE DEFECT UPON WHICH THE CLAIM IS BASED.

No guarantee is made or authorized to be made by Seller other than that above set forth.

Executed and issued _____ 1961

Signed by your Caterpillar Dealer, this bond gives you up to $10,000 worth of machine dependability

Bonded Buy means guaranteed machine dependability. You can get a completely-checked, used Cat-built machine that has the Cat Dealer's confidence and guarantee, PLUS this bond from Lumbermens Mutual Casualty Company that backs up your machine with as much as $10,000 worth of parts and labor for the period you and the dealer agree upon.

See your dealer. Read the bond. Check the details. This guarantee can apply on your next used machine. And you pay no extra premium for this assurance. Dependable Bonded-Buy machines are priced right—and your Cat Dealer offers terms to match your needs. Call him or see him soon. Do business with the man whose business is built on dependability.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

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People

GEORGE HAROLD KIMBER has retired from the Calcium Chloride Institute following 14 years as its president, and the past year as board chairman. He will continue to serve in an advisory capacity on special projects when necessary.

As former head of the executive committee for the Calcium Chloride Association, Mr. Kimber became its managing editor in 1946, and served in that capacity until 1951 when, following his direction, the CCA was reorganized and incorporated as the Calcium Chloride Institute.

George H. Kimber

LEROY F. JOHNSON, a pioneer in winter maintenance, has retired as maintenance engineer of New Hampshire's Public Works and Highways Department. He was for 46 years in highway service.

One-time chairman of the Snow and Ice Control Committee of the Highway Research Board, Johnson pioneered de-icing methods involving sodium chloride, and gained an international reputation as a highway maintenance engineer, with many now-established innovations to his credit.

ELMER M. WARD, 59, assistant director of the Highway Research Board for the past seven years, died suddenly. Nationally known in highway engineering he had served the Board since 1946 following an early professional career with the Iowa Highway Commission. During the war years he was with the U. S. Army Corps of Engineers, helping develop methods for desert road construction.

Durable "Defense-in-Depth" paint stays like new through long Maine Winter

Interrupted job on big Kennebec Bridge shows how Basic Lead Silico Chromate pigment combines outstanding weather resistance with rust inhibition.

On Maine's mile-long double-decked Kennebec Bridge – during a recent severe Winter–"Defense-in-Depth" was proved to be no catch-phrase.

Which coat is the fresh coat? Half the bridge received its finish coat in the Fall, after spot priming–and an intermediate coat where necessary. Then the job waited out the Winter. When the finish coat was completed on the other half in Spring, it was hard to tell the difference between the two sections. The half painted the previous Fall had not weathered noticeably.

Rust inhibition, weather resistance and durability ... all three advantages are combined in paints containing *M50*® Basic Lead Silico Chromate pigment. All three properties can be provided in *every* coat–primer, intermediate and finish. This is "Defense-in-Depth"–anti-rust action that goes from the primer up through the finish coat, plus durability that goes from the finish down through the primer.

Now used by 11 states for bridges and structures, *M50* pigment is proving these and other benefits. It restricts underfilm rust creepage. It's tintable–with a low color strength permitting high pigmentation in almost all shades. To get more helpful information, simply write to National Lead Company.

M50 an **oncor** Pigment...
A Development of **National Lead Company**

General Offices: 111 Broadway, New York 6, N.Y.

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CASTINGS?

That's all we make!

And on hand for immediate delivery are thousands of standard designs such as –

What's more, we have

15,000

patterns from which construction castings can be produced fast.

Our 168 page catalog of Gray and Ductile Iron castings will be sent promptly upon request.

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NEENAH • WISCONSIN
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Court Decisions

Subcontract Wording

Suit by an Illinois contracting company against a subcontractor to recover damages for a breach of contract ended recently in a dismissal of the action. The ground: that the subcontractor had made no agreement and assumed no obligation, other than to operate an hydraulic dredge diligently on the material described in the agreement. From this decision the contractor appealed and by the higher court this dismissal was set aside and a new trial ordered.

In this contract it had been recited that the subcontractor desired to supply and operate an hydraulic dredge to remove materials, in conjunction with the contractor's undertaking for the construction of 3,697 feet of highway south of the City of La Salle in that state.

In this contract were the further provisions that unsuitable earth material should be removed to the lines and grades specified, that the contractor would pay the subcontractor fifty dollars an hour for each hour of dredging operations with the stipulation that 110 cubic yards per hour should be removed, followed by, "It is further agreed that the contractor will guarantee the subcontractor a minimum of forty hours of operation," and that the subcontractor "furnish to the contractor a performance bond and certificate of payment of premium thereon." Nowhere in the agreement however, was set out a specific promise of performance by the subcontractor other than the furnishing of the performance bond.

In the defense against the action brought by the contractor, it was contended by the subcontractor that in this agreement there was no contractual obligation on the part of the subcontractor to remove any specific amount of dirt. Further, that by the agreement the subcontractor was to operate a hydraulic dredge and work diligently and consistently to remove the material, with a guarantee of fifty dollars an hour for 440 hours.

In its reversal of the decision of the lower court that the subcontractor had assumed no obligation to remove any specific quantity of dirt, the appellate court said, "An analysis of the language of this contract shows the subcontractor desired to supply and operate a hydraulic dredging outfit to remove the material classed as either dump removal or unsuitable earth removal, and that he was to furnish all labor necessary to do so and pay all expenses in connection with the hydraulic dredging.

"If the subcontractor was obligated to bear all the expenses of the operation he certainly must have intended to do the work. And as the general contractor agreed to pay the subcontractor $5,150 when the hydraulic unit was on the job, why should the contractor do this if the subcontractor was not going to do any work? The subcontractor was also guaranteed a minimum of dump removal work. If the subcontractor had not agreed to do anything this guarantee would be unnecessary and meaningless."

This statement was supplemented by the court with a quotation from an earlier decision in that state. "A contract should be construed in such a way as to make the obligations imposed by its terms mutually binding upon the parties unless, such construction is wholly negatived by the language used."

Trompeter Construction Co. v. Higby, 161 N.E. 2d 159, Illinois, April 29, 1959

Contractor Sues An Unqualified 'Sub'

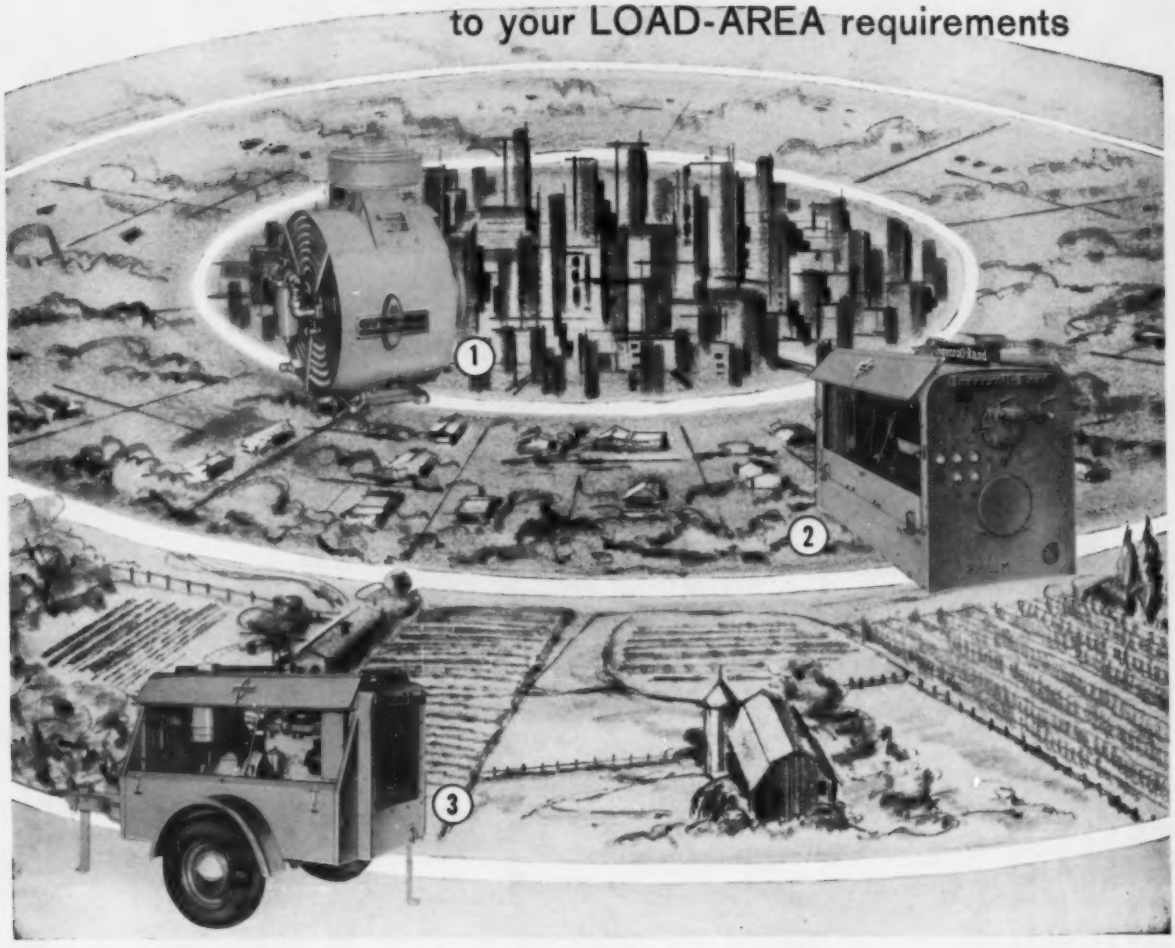
Contract had been made by a general contractor with a sub-contractor and its surety in the construction of a highway in Portsmouth, Virginia and the work abandoned by the subcontractor after about 90 percent had been performed. At the time this agreement had been made the subcontractor was not a licensed contractor although it had applied for such a license.

In its defense to the suit brought

Continued on page 34

MATCH THE COMPRESSOR

to your LOAD-AREA requirements



Now you can get a GYRO-FLO portable compressor with the right combination of space, weight and power for any operating conditions

1. For METROPOLITAN AREAS

it's the Power-Takeoff unit

This super-compact Gyro-Flo compressor, for direct or belt drive from the service truck power-takeoff, is ideal for busy metropolitan areas where truck size must be kept to the minimum. These 85-cfm and 125-cfm compressors take less than 3.6 and 4.9 sq ft of floor space respectively, leaving plenty of extra space for men and equipment. Air-operated engine speed control and combination air receiver and oil separator can be mounted wherever convenient.

2. For SUBURBAN AREAS

it's the Self-Powered Truck-Mounted unit

Where larger service trucks can be used and space is less critical, self-powered 85-cfm and 125-cfm Gyro-Flo compressors for truck mounting offer the advantages of maximum fuel economy, simplicity of operation and reduced wear and tear on the truck motor. There are no gears, clutches or belts and the compressor can be removed to free the truck, if necessary, when only the compressor is needed on the job.

3. For OUTLYING AREAS

it's the Completely Self-Contained Portable unit

Where there's ample room for needed equipment at the job site, the completely self-contained Gyro-Flo portable compressor offers maximum convenience, flexibility and economy. You can tow it to the job and immediately release the truck for other work. Wheeled units are available in sizes from 85-cfm to 900-cfm, to meet any air power requirements.

Ask your Ingersoll-Rand Distributor or engineer for complete information on the Gyro-Flo that will meet your needs to best advantage.

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The World's Most Comprehensive Compressor Experience

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6110

Two mighty snow movers for your Galion Grader!

You move mountains of snow, cut drifts down to size with a Snow Plow and Wing. Made in sizes to fit any Galion Grader, these sturdy attachments let you clear more miles of road every working hour.

"V" type Plow is constructed and braced for heavy-duty service—designed to slice through the deepest snow. Renewable cutting edge is high carbon steel. Sliding shoes (with renewable wearing plates) keep Plow from digging into road.

Use the Galion Snow Wing to clear road shoulders, cut down high drifts. It adjusts up to four feet from ground level at an angle of 45°, providing a cutting height of eight feet.

Both Plow and Wing are hydraulically controlled from the cab. Independent operation means less work for the man in the cab . . . fast and accurate adjustment of Plow and Wing.

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ROLLERS AND GRADERS

See your Galion distributor or write for descriptive bulletin.

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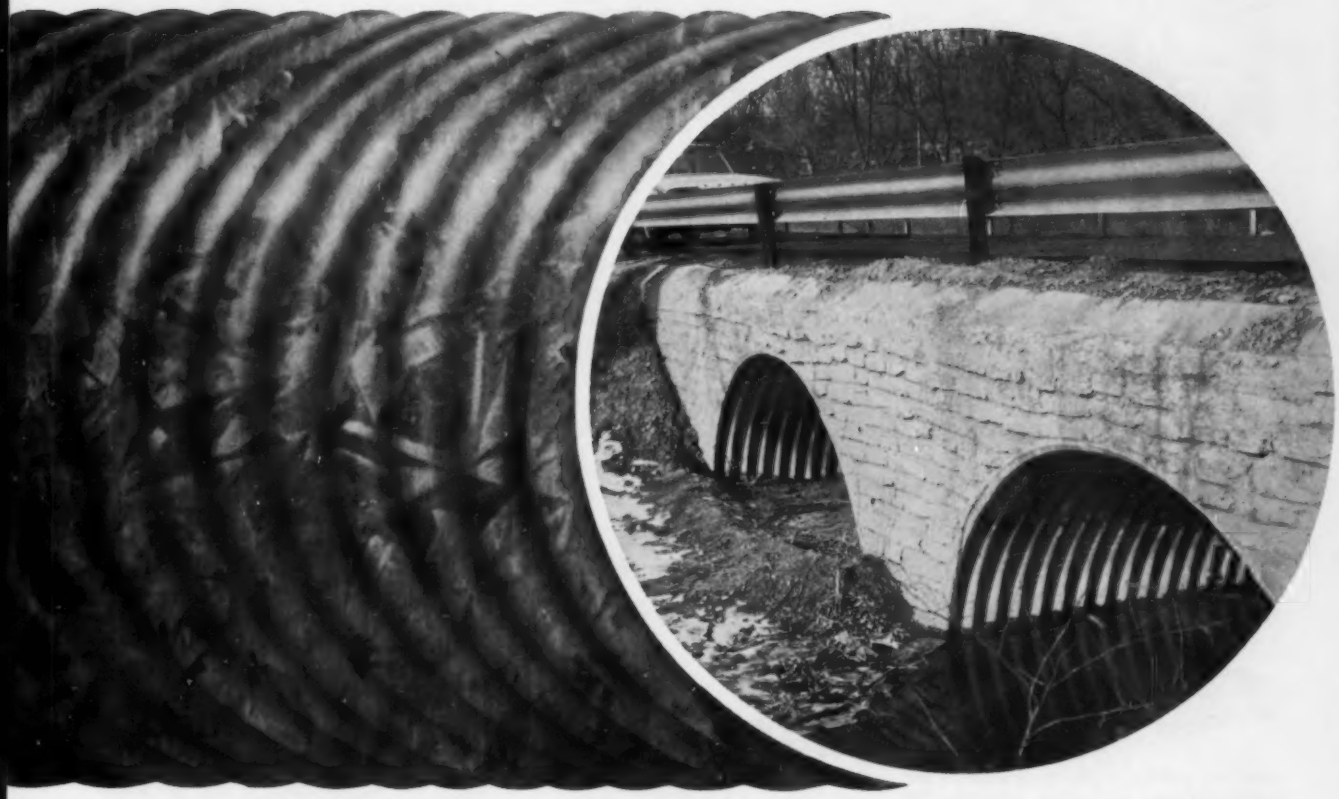
General and Export Offices, Galion, O., U.S.A., Cable Address, GALIONIRON, Galion, O.

Guardrails and culverts live longer . . .



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Wherever traffic or drainage flows, you'll find modern galvanized steel at work. In guardrails, for example, where nothing quite matches galvanized steel: the strength of the steel for impact; the coating of zinc for durability and ease of maintenance; the economy of the combination. And in culvert pipes, where the exceptionally high strength-weight ratio of this zinc-coated metal brings cost per year down to the barest minimum.

WEIRKOTE® IN PARTICULAR—You gain when you specify long-life galvanized steel for guardrail and culvert installations. And you gain even more when you specify National Steel's Weirkote. To the inherent strength of steel, Weirkote adds *enduring* zinc protection. Weirkote is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. For further details, write Weirton Steel Co., Weirton, West Virginia.

MIDWEST STEEL
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For Nearly Half a Century

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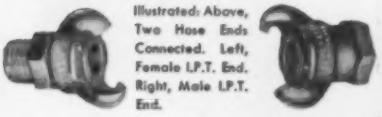
UNIVERSAL TYPE
HOSE COUPLING
Quick-Acting, Versatile, Safe...

FOR COMPRESSORS, ALL KINDS OF AIR TOOLS, WATER, OIL AND SPRAY HOSE



Illustrated: Above, Two Hose Ends Connected. Left, Female I.P.T. End. Right, Male I.P.T. End.

Used the world over for its convenience and reliability under all service conditions. No parts to foul up or get out of order. Locking heads same size for all hose shank and threaded end sizes up to 1". Quickly connected and disconnected. Auxiliary locking device for added safety. Regularly furnished in rustproofed malleable iron or bronze, but available in other metals on special order.

FOUR-LUG STYLE—Same as above but in larger sizes. Hose Ends, Female I.P.T. Ends, 1¼", 1½", 2".

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Court Decisions

Continued from page 30

by the general contractor for breach of contract the subcontractor relied on a statute of that state that any person not duly authorized so to do, who contracts for or bids upon a construction project without first being licensed, is guilty of a misdemeanor.

This section of the statue is followed, however, by, "Provided that no person shall be entitled to assert this section as a defense to any action at law or suit in equity unless such person shall affirmatively prove that notice of this section, prior to or upon the execution of the contract, had been given to the party who seeks to recover from such person," and further, that nothing there contained should affect any contract entered into prior to July 1, 1956.

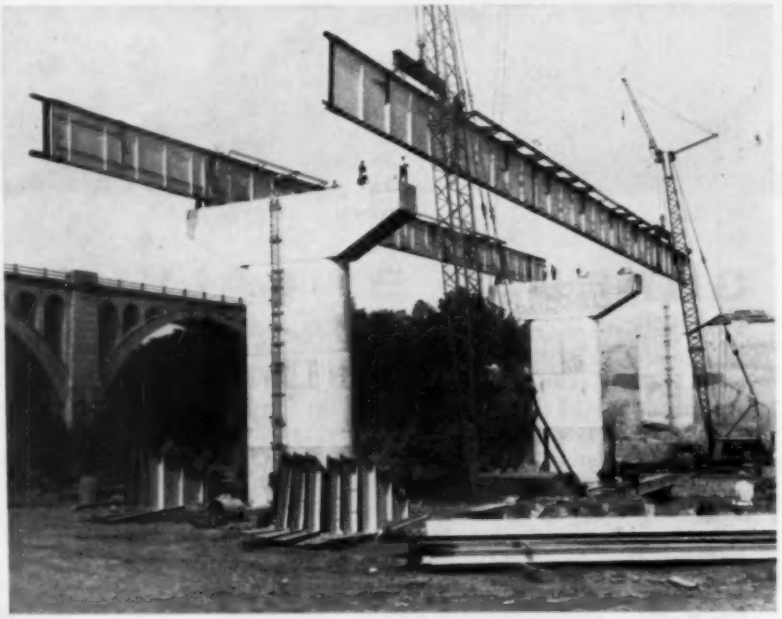
This agreement, however, had been made on July 1, 1955, one year before this date set by the statute. "And since the amendment to the section affected the remedy and not the vested rights of the parties, it was constitutionally valid," asserted the court.

"Nor is the general contractor's right to enforce the contract barred because it knew at the time of its execution that this subcontractor had not been licensed as required by the statute. If a bargain is illegal, not because the performance promised under it is illegal but only because the party promising it is forbidden by statute or ordinance to do so, the prohibition is aimed at that party only and he is the only wrongdoer.

"The other party being himself subject to no prohibition or penalty, may even be one of the class of persons for whose protection the prohibiting statute was enacted. Upon these principles we hold that the contractor's right to maintain this action against the subcontractor, was not barred."

(Enlow & Son v. Higgerso, 113 So. 2d 855, Virginia, April 25, 1960.)

Longest Girders Ever Erected in One Section



Two 262 ft. plate girders—thought to be the longest ever erected in one piece—are placed on piers for the Route 422 By-Pass over the Schuylkill River near Reading, Pa. High strength bolts were used to field splice the three sections of the 98-ton girder before erection. This operation required a temporary steel bridge to "cradle" the girder (shown just above the water). Fabrication and erection is being done by Phoenix Bridge Company of Phoenixville, Pa. (Photo courtesy American Institute of Steel Construction, Inc.)

Job records prove Firestone's

OFF-THE-HIGHWAY TEAM CUTS DOWNTIME

1. **Firestone Giant Tires** are ruggedly built to reduce downtime. The SUPER ROCK GRIP (WB) is a good example. With exclusive Firestone Rubber-X and Shock-Fortified cord bodies, this hard-working giant *keeps* your equipment on the move—lets you roll up more yardage with less downtime because it's the toughest off-the-highway tire Firestone has ever built!

2. **Firestone Giant Tire Service** puts a Tire Specialist right on the job to help you eliminate difficulties caused by excessive speeds, heat, cutting, breakage, or *any other* tire problem. In most cases, he's able to spot tire trouble *before* it starts, and save you money by cutting downtime.

Get all the details now on how Firestone's off-the-highway team . . . Giant Tires and Giant Tire Service . . . can add to *your* production and profits. Call your Firestone Dealer or Store, or write: Manager, Off-The-Highway Tires, The Firestone Tire & Rubber Company, Akron, Ohio.

Always Specify Firestone Tires When Ordering New Equipment.

Firestone

FIRST IN OFF-THE-HIGHWAY TIRE NEEDS

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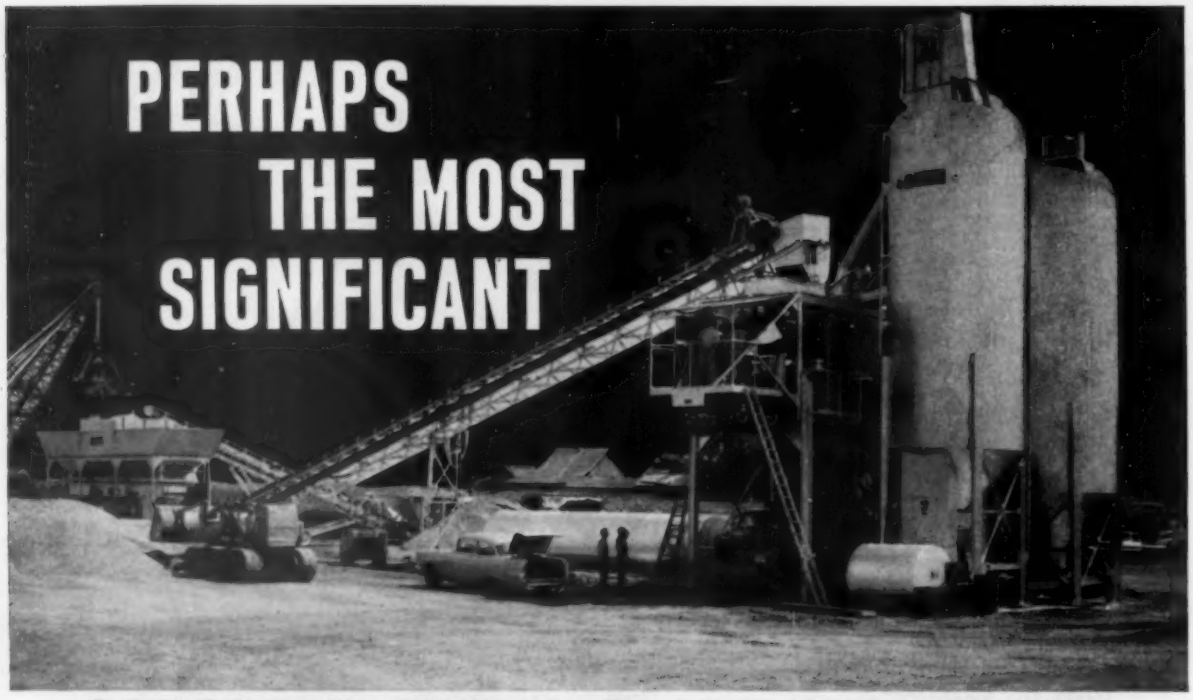

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CONCRETE PAVING PLANT EVER BUILT...

for Extremely High Production and Mobility

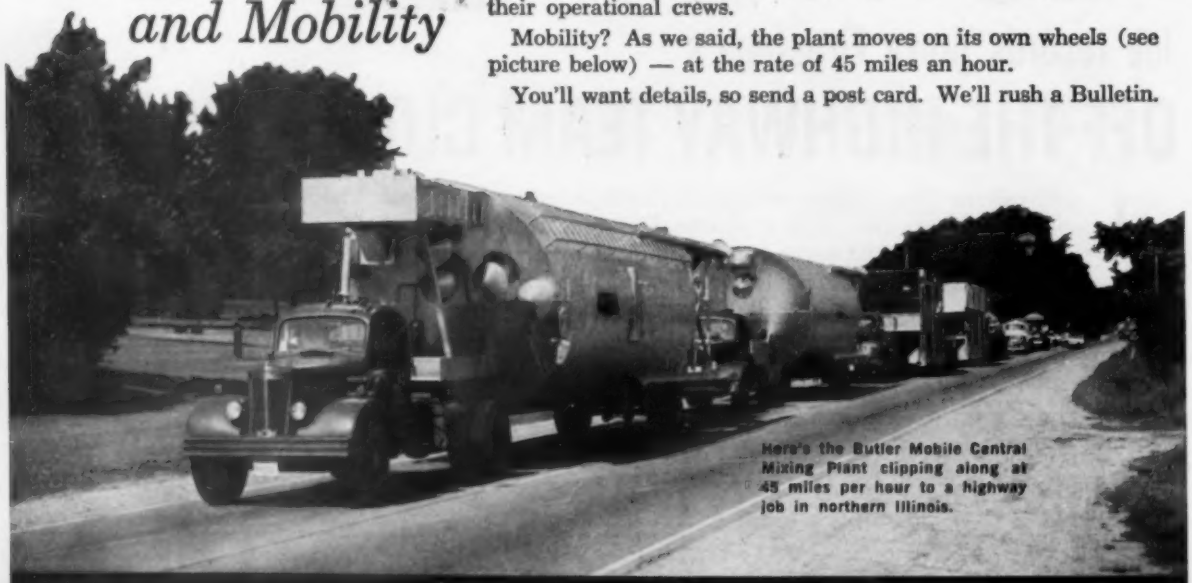
Everything — two big turbine type mixers, cement and aggregate bins, belt conveyors, batchers, fully automated control equipment (completely packaged) — every component on wheels.

It's an entirely new BUTLER Central Mixing Plant for paving — or other construction.

This one plant is engineered to replace 3 or more pavers and their operational crews.

Mobility? As we said, the plant moves on its own wheels (see picture below) — at the rate of 45 miles an hour.

You'll want details, so send a post card. We'll rush a Bulletin.



Here's the Butler Mobile Central Mixing Plant clipping along at 45 miles per hour to a highway job in northern Illinois.

BUTLER BIN COMPANY

959 Blackstone Avenue • Waukesha, Wisconsin

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Give YOUR operator the shovel that gets the job done!

THERE'S a reason why you find Northwest machines on the tough jobs! It is the record they have made on thousands of jobs, large or small, for getting the job done!

POWER TO HANDLE ROCK: Shovels are bought to handle rock! It takes power — and ripping through hard material takes smooth *control* and *power.* Your operator needs the "feel" that tells him what his dipper teeth are doing. He needs the most powerful Crowd you can give him. *Put him on a Northwest!* Give him the Shovel that has *speed, power and endurance.* Give him the Shovel with the Dual Independent Crowd!

Give him the Feather-Touch Clutch Control, that lets him nudge a rock with the feel of the load to a degree *impossible* with any air or hydraulic control.

Watch a Northwest work . . . It will pay big . . . Talk with Northwest owners. Keep posted on Northwest equipment. Let a Northwest man bring you up to date.

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CRANES • SHOVELS • DRAGLINES
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3/4 to 3 Cu. Yd. Capacity

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Powr-Pactor

PATCHES ASPHALT FASTER . . .

Maginniss *vibratory* compactors speed placing and patching of blacktop . . . are easily moved from job to job . . . work fast, at speeds up to 50 ft. per minute. Water feed prevents asphalt adhesion . . . assures smooth finish.

Put Maginniss Powr-Pactors to work on your blacktop jobs. The increased production, lower costs and small initial investment will surprise you. Call your Maginniss distributor today!

WHERE TO USE IT:

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County Roads, sub-base and asphalt maintenance.
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Maginniss HI-LECTRIC POWER TOOLS

Find your nearest distributor in the Yellow Pages.

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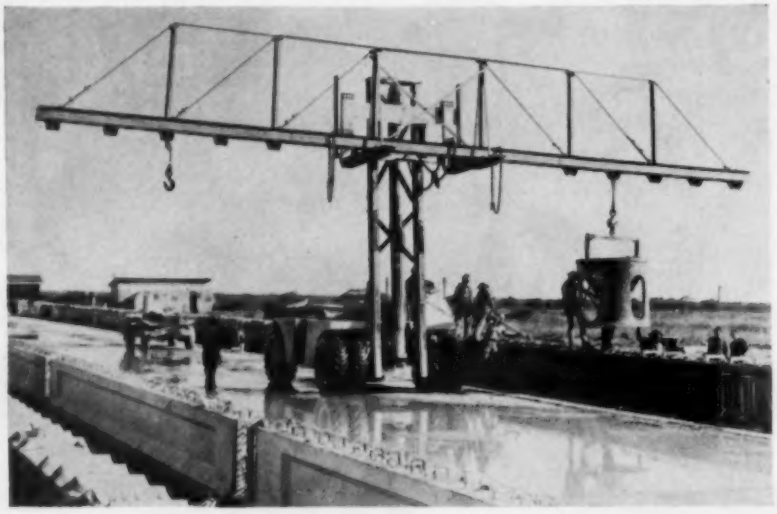
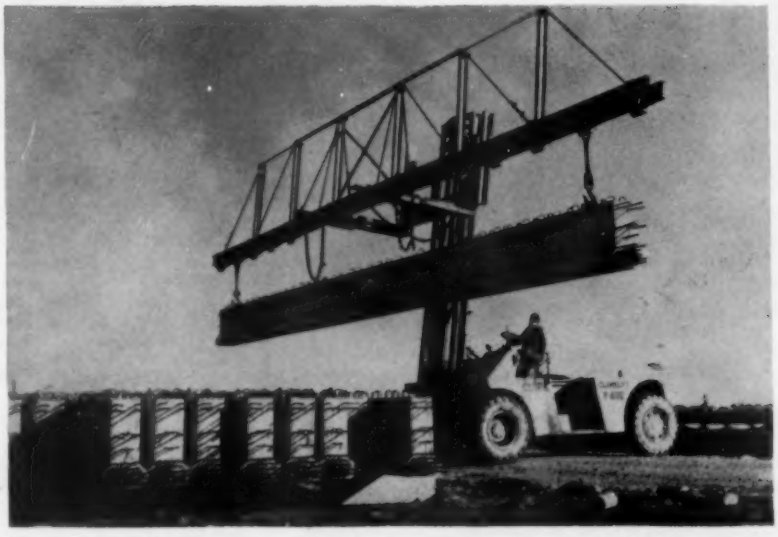
Efficient Handling Unit for Precasting Bridge Beams





A 30 percent reduction in maturing time of prestressed concrete bridge beams, plus a large fuel saving, is reported from use of a Clarklift CY-400 fork truck, replacing other types of equipment at Anchor-Wate Company, Houston, Texas. Note special lifting frame and hook arrangement which handles concrete bucket (upper view) and later beam forms and finished beams (lower). Heaviest load handled, 19 tons.

PCA's New Soil-Cement Film Available

A new 16-mm. sound-and-color film produced by the Portland Cement Association describes the standard ASTM-AASHO laboratory procedures for testing soil-cement and the latest short-cut testing procedures used with sandy soils. The methods described in this newly-revised film conform with current ASTM-AASHO test methods for soil-cement.

The film, "Standard Laboratory Control of Soil-Cement Mixtures" is available on loan in the United States and Canada from the Portland Cement Association, 33 West Grand Avenue, Chicago 10, Illinois.

Want better scraper versatility?

the TS-14 all-wheel drive "Euc" is the answer!

Whatever your scraper requirements may be, the Euclid TS-14 can cut earthmoving costs on a wide range of work—from small yardage jobs to the biggest projects.

All-wheel drive and 14 yd. struck capacity puts this "Euc" way ahead of other medium size scrapers in performance and overall work-ability. With a total of 296 h.p. and separate Torqmatic Drive for each axle, the TS-14 picks up heaped loads in a hurry... gets out of the borrow pit or cut fast... and really rolls on the haul road. It loads itself in practically any material... and with a push tractor it's a big producer on the toughest scraper job.

Here's a one-man earthmover that reduces your equipment investment... works more days per year... handles a wider range of work because it isn't stalled by steep grades or adverse conditions. Ask your dealer for complete information... better yet, have him show you a TS-14 in operation.

EUCLID Division of General Motors, Cleveland 17, Ohio

Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

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FOR MOVING EARTH, ROCK, COAL AND ORE

Model 304 ferries concrete for world's longest suspension bridge

Because of its speed . . . power . . . and mobility this Trojan tractor shovel has been a prime factor in keeping the joint venture of J. Rich Steers, Inc. and Frederick Snare Corp. on schedule. During construction of two tower piers on either side of the Narrows for the Verrazano-Narrows Bridge, the Trojan 304 will handle 32,000 yards of concrete.

On a small island 150 feet from shore, the powerful 304 ferries concrete from a central batch plant over a U-shaped, 400 foot haul road to the crawler cranes. Handling 2½ yards of wet concrete, the 304 completes one full work cycle in less than two minutes. Actual travel time to negotiate the haul road is 40 seconds . . . either in forward or reverse direction.

When your job means moving heavy loads at a profit, consider the cost saving features of the Trojan tractor shovel. For an on-the-job demonstration of any of the seven models with capacities from 7,000 to 24,000 pounds, ask your Trojan distributor.

TROJAN

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HELPS BRIDGE THE NARROWS

VERRAZANO-NARROWS BRIDGE

When completed in 1965, the bridge will be the longest suspension span in the world. Crossing the Narrows of New York Bay between Brooklyn and Staten Island its total length, including approach structures, will be 13,700 feet. At its mid point, the lower traffic deck will be 227 feet above the water.

TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION • BATAVIA, NEW YORK

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Publications

LARGE SAVINGS IN THE COST of concrete pavement are seen as a possibility, if paver mixing time is reduced. Even a few seconds reduction in the paver cycle might mean savings of millions of dollars in a working season, taken nationally.

This is the over-all conclusion from a paper contained in Bulletin 265, published by the Highway Research Board, 2101 Constitution Ave., Washington 25, D.C., and available at $1.40.

The paver cycle time data are contained in one of the bulletin's papers, by Morgan J. Kilpatrick, chief, construction economy branch, U.S. Bureau of Public Roads. His paper, "Cost vs. Mixing Time on Dual Drum Pavers," spotlights the advances in mixing and hauling equipment. These advances have made possible good concrete mixing at higher speeds than are now permitted by many of the state highway specifications. Some states still require as long as 120 seconds mixing time per batch. By clipping 50 seconds off the cycle, $2.98 per cu. yd. could be saved in job costs due to speeded production, according to one calculation.

Other papers contained in Bulletin 265:

"Construction Practices on Cement-Treated Subgrades for Concrete Pavements," by F. N. Hveem, materials and research engineer, California Division of Highways, Sacramento, Calif.

"Adjustment of Concrete Paving Equipment," by Warner Harwood, senior highway engineer, Paving Bureau, Portland Cement Association, Chicago, Ill.

"Construction Practices for Placing, Finishing and Curing Concrete Pavement," by J. F. Barbee, rigid pavement and concrete engineer, Ohio Department of Highways, Columbus, Ohio.

"Construction Practices for Materials Control and Batching Operations for Rigid Pavement," by W. M. Stingley, concrete engineer, State Highway Commission of Kansas, Topeka, Kansas.

"A Study of 34-E Pavers," by D. O. Woolf, highway physical research engineer, Division of Physical Research, U.S. Bureau of Public Roads, Washington, D.C.

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SEALCOATING
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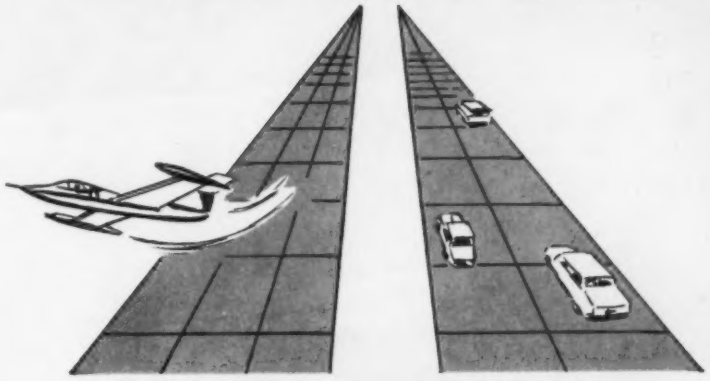

Especially for Airfields and Highways

Ask for Flintkote Data Sheets

M-200: Fast setting, polymer type joint and crack sealer for concrete pavements—cold applied. Offers best resistance to jet aircraft heat and blast operations under wide temperature variations. Meets Interim Fed. Spec. SS-S-00200a.

H-100: Modified polymer type, two-component compound for concrete pavement and structure joints in highway and non-critical airfield areas. Has many advantages over other hot or cold sealers.

FLINTSEAL® (Regular—SS-S-164) and (Jet Fuel Resistant—SS-S-167b): rubber bearing, hot-poured types for durable sealing of joints and cracks to prevent leaking and provide resistance to wear under repeated freeze-thaw cycles. Meet Fed. Spec. for both types.

FLINTAR® (Regular—R-P-00355a) and (Rubberized): Coal tar pitch emulsions for sealcoating and slurry coating bituminous driveways, parking lots, roads, airfield pavements. High resistance to petroleum fuels, oils—extends life of black-top. Meet all specifications.

FLINTCRETE*: Polysulfide/epoxy compounds (grout and binder) for bonding old and new concrete in restoration and repair of pavements and structures, bonding curbs, traffic markers, skid-proofing and many other adhesive requirements. Procedures fully detailed.

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America's Broadest Line of Building Products

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This is the blade to cut your costs

. . . because CF&I Cutting Edges are scientifically designed and carefully manufactured to give long, trouble-free service on dozers, scrapers, snowplows, graders and allied equipment. Made of special analysis steel, these rugged, dependable-service blades have the endurance and long-wearing qualities that assure the greatest number of operating hours per dollar of blade cost.

To meet your requirements, whatever they may be, CF&I maintains nation-wide inventories of many different types of blades and cutting edges through its many distributors. For complete details and quick, dollar-saving delivery, contact your distributor or your nearest CF&I sales office.

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Hydraulic power makes it easy

Ease of operation, positive control, convenience — for years these and other operator suggestions have been a major factor in the design of Huber-Warco motor graders. A prime example is Huber-Warco's complete Hydraulic Control System. It eliminates fatigue, gives the operator instant positive power, allows him to operate two or more controls (all within easy reach) at once. Hydraulic power means no shoving or tugging at controls, no fear of levers kicking out of position since any cylinder can be locked in any desired position. Finer control of both heavy and the finest finish grading is assured. Best of all, Hydraulic Control develops the skill and confidence so necessary for big production. See the Hydraulic Controls as well as the other outstanding features you get in Huber-Warco motor graders and check Huber-Warco's full line of 3-wheel and tandem rollers, and maintainers at your Huber-Warco distributors soon.

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This simple nuclear compaction test can save you $23,000 a year

A NATIONWIDE SURVEY of 1,200 large road-building and earth-moving contractors revealed that compaction equipment dead-time, call-backs, and lost man-hours cost them an average of $23,000 a year. They reported reluctance to move equipment and crews down the job until inspectors had okayed compaction. (Copies of this survey are available on request.)

This sort of costly delay can be avoided by alert contractors who use Nuclear-Chicago's d/M-Gauge for on-the-spot checking of moisture and density in subgrades, embankments and base courses. This fast, accurate test method can pay for itself on a single job by letting contractors move ahead of inspectors—confident that compaction will meet specifications.

More than 500 of Nuclear-Chicago's reliable, portable d/M-Gauge systems are now in use by soil laboratories, state and federal highway authorities, engineers and contractors. Users report that accuracy is superior to slow, cumbersome, conventional methods. They like being able to get accurate, non-destructive measurement on a great variety of soils and materials. They like the immediate, in-field readings that pay off in time and dollars saved. It will pay you to get all the facts now from Nuclear-Chicago, pioneers in the application of the nuclear method to compaction control.

See the d/m-Gauge in operation at the A.S.C.E. convention, October 16-20, New York City, Statler-Hilton Hotel, Booth 67.

Write to receive your copy of this new application and specification booklet or to request a demonstration.

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Editorial

How Would You Handle a Really Big String of Road Jobs?

Breathes there a man with soul so dead who never to himself has said, "Why can't we move this yardage on a long conveyor belt?"

This issue carries a report on a contractor who is doing just that, and of all places, on a highway job. A "dream come true" story is Brewster's, who has assembled an unprecedented $50 million plus string of highway contracts in one tight area management. "They're running the thing like a big dam job," one onlooker put it. Which is an apt description of the metropolitan freeway work being performed by George M. Brewster & Son Inc. just off the New Jersey end of the George Washington Bridge, opposite New York city.

People who say that highway construction has tended to become routine should see the two-mile-long rock conveyor, the big crushers, taking rock from five-yard electric shovels, the special compressor station and power substations. This collection of jobs swallows up, among other items, a large sand drain installation across a marsh, and a $10.7 million interchange, largest single contract in Jersey highway department history.

"All this is fine for Brewster," is a first reaction, "but is it good for the highway program and the taxpayer?"

We say it is. Road building is getting to be bigger business each year. There will be other opportunities for bidders to take on large job loads in metropolitan areas, what with the billions' worth of complex freeway projects coming along. Competition will be keen on these jobs, and any contractor who sees a chance for fitting a string of them into a single field management will need to give the taxpayer a good dollar's worth. And there will still be a lot of work for the smaller fellows.

The big highway work loads enjoyed by Brewster and others in the East, and by such firms at Atkinson, Kiewit and Griffith on the West Coast, point to an aspect of highway contracting that concerns everybody. That is the problem of finding a full season's use for major equipment. Multiple-job operation with tightly controlled inter-job assignment of machines is a growing pattern for this reason, with small and modern sized firms pursuing this policy as well as larger firms. A trend to watch along with the special methods unfurled here and there by such contractors as Brewster.

New Electronic Methods Pose Questions

The great advance by the more progressive highway departments in making use of new electronic techniques was spotlighted by the conference on improved engineering productivity, held recently in Boston. Photogrammetric surveying, location and quantity estimating are well publicized phases. Less talked of until recently are the new methods of communication which make possible the quick transmission of data from central office or district office to the field or in reverse flow.

Members of the Bureau of Public Roads and AASHO staff and others who framed this conference deserve an "Oscar" for their leadership in bringing the various possibilities of the "new technology" into fresh perspective.

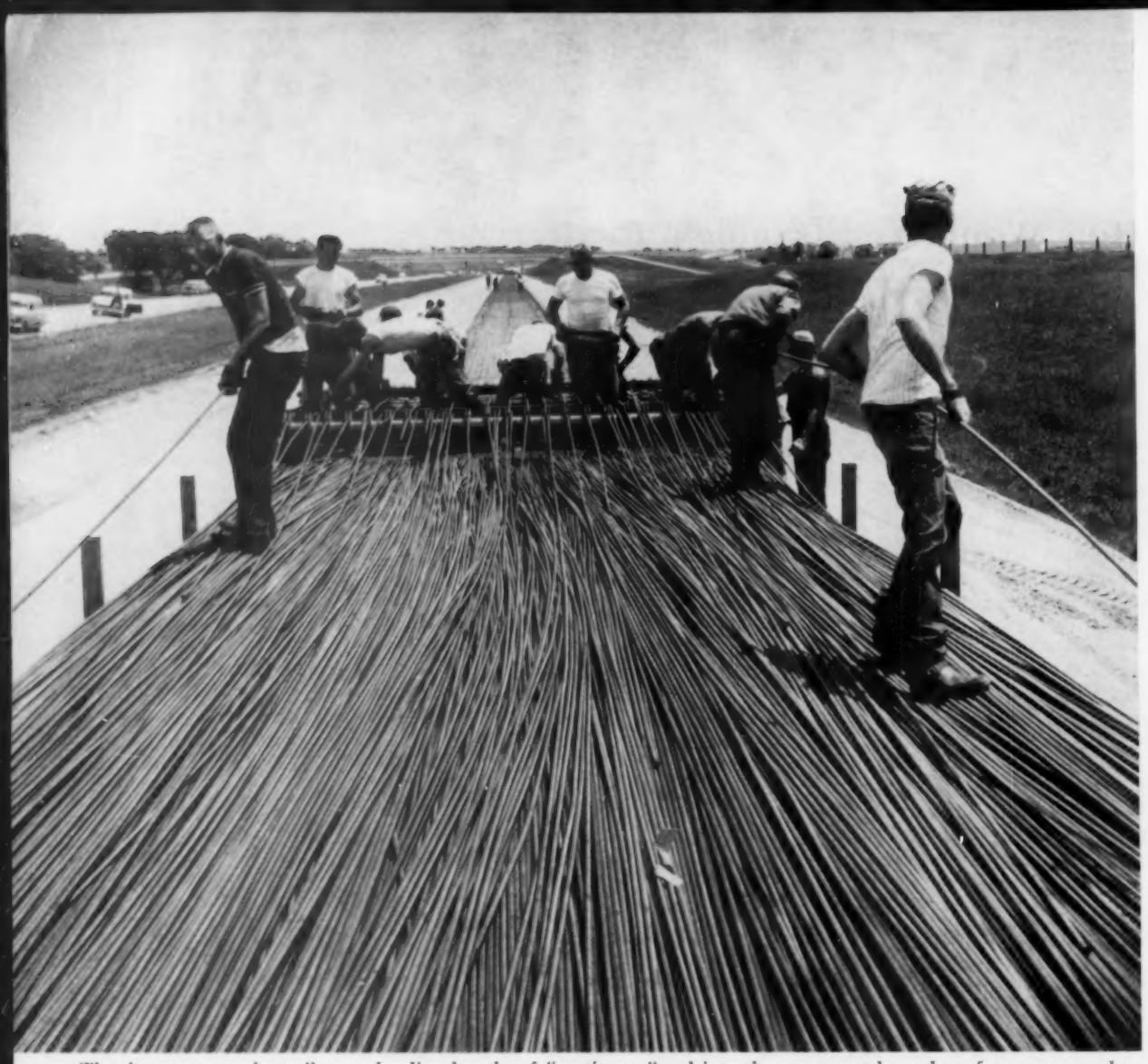
Which brings up a couple of questions at this stage. One: will we see the usual lag by some of the highway departments, in adopting these new tools or making the fullest and best use of them? This question applies not only to the state departments, but also to some of the metropolitan county road and municipal public works agencies, which have grown big with complex programs and engineering work to be handled under the growing urbanization.

If history repeats itself, some agencies will continue to lack the leadership, manpower, or spirit to keep abreast—a condition that may stem from the disease of spoils politics.

The other question raised by the new engineering advances is a long-range one. With the highway agencies gearing up to a higher productivity and efficiency level each year, the need is greater than ever for the national Congress and the state legislatures to also adopt some modern "electronic" thinking in behalf of long-range program adoption and financing continuity. It is costly and damaging indeed for one session to adopt a large program, giving the go-ahead for accelerating the highway administrative and engineering tempo, only to have the next session threaten to turn half the electronic tubes off, so to speak (to say nothing of idling millions of dollars' worth of contractor equipment).

Right now we are all lulled for the moment, Congress having given us some funds after months of agonizing uncertainty to put the Interstate-Defense highway effort back nearly on schedule. The state legislatures have gone home, or most of them. Perhaps now is a good time to plan some "electronic" conferences at which legislative people will be the principle attending students.

Harold J. McKeever



The three men on the trailer are heading lengths of "continuous" rod into the spacer notches, where four crew members (two standing facing camera) splice bar lengths. Men at second position tie this steel to the transverse bars.

Speedy New Method of Placing Continuous Reinforcement

By James R. Cummings
Associate Editor

Wisconsin's first continuously reinforced concrete pavement has been put down about 10 miles north of Madison. The job bore the label "experimental" and fittingly enough was won by a contracting firm with more than one successful experimentation to its credit in concrete paving methods.

This 4.2-mile $761,500 contract was one of three on Interstate Route 94 north of Madison held by F. F. Mengel Co. of Wisconsin Rapids. The other two, totaling 8.9 miles, involved conventional wire mesh reinforcemeent.

The Mengel organization, one of the Midwest's leading exponents of central mix paving, employs as the core of its paving operation a unique "reciprocating" conveyor-spreader first proved on a Mengel Interstate job south of Milwaukee in 1959. (See Roads and Streets, December 1959, "Novel Spreader Sparks

The Rex central mixing plant as set up by F. F. Mengel for the Wisconsin I-94 project.

Paving Job.") Thus with this structure-on-wheels following behind a "spaghetti-lacer" contrivance for placing reinforcing steel, Mengel's roadbed operation on the I-94 contract was an exercise in contractor ingenuity which brought stares from professionals as well as laymen.

It was Bill Mengel's method of laying reinforcing bars at proper height and spacing between the forms that warrants attention here—plus, later, some references to his theories on the practicality of this type of paving operation.

The problem consisted of laying this reinforcement properly, yet at a speed which would permit the paving train to move at a normal pace. Mengel, as his own job superintendent, devised this technique:

An International KB-8 truck tractor was fitted with a long dual-axle flatbed trailer body which was pulled in turn, between the forms. The flatbed trailer, towed a short trailer attachment riding on the forms or on slab as desired. The bed of the trailer carried hundreds of 40-ft. lengths of longitudinal reinforcing bars. Toward the rear, a piece of tubular steel, raised from the trailer bed and extending across its width, bore small welded notches or "spacers" which had been bent in a concave manner to the diameter of a reinforcing bar and then welded to the steel supporting beam on 6-in. centers. The next "station," 6 ft. to the rear and at the very end of the trailer, consisted of another, smaller supporting frame, parallel to the first.

The small trailer had a shelf or bed for the supply of transverse rods. It carried the drums containing the "chairs" for support of the reinforcement on the grade, and also supported the roller on which the

Another view of the reinforcement operation. Visible on the auxiliary bars and the two drums (one on each side) containing the "chairs" which support the rod on the roadbed.

reinforcement was fed down to the roadbed.

Mengel paved one lane at a time, an 8-in. slab 12 ft. wide. Reinforcement consisted of ⅝-in. longitudinal bars on 6-in. centers, with 11′ 10″ transverse bars of the same diameter spaced every 4 ft.

How Job Pace was Maintained

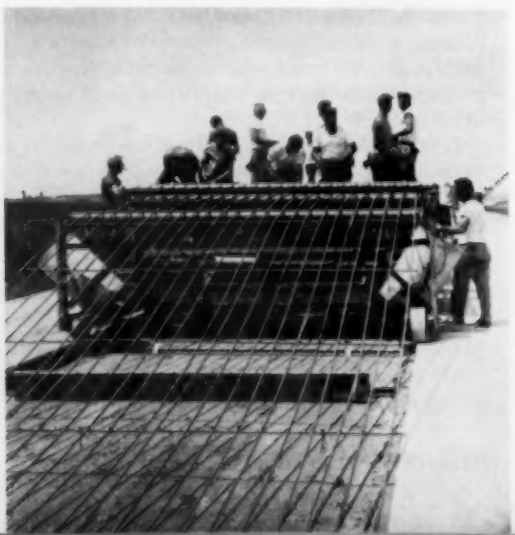
The company's challenge was the placement of the reinforcement well enough to meet close state inspection—and fast enough to stay in front of the paving crew. Mengel was able to do both, to the tune of close to a mile a day, on the average. Here's how it was done:

Three meen working in the bed of the trailer picked up the individual rods and nosed them into the spacers. Four men working here tied these rods onto the preceding lengths, with an overlap of about 18 in. For added strength, two separate ties were made, because the rods already on the grade "pulled" the following rods out of the trailer.

At the next post, five crewmen tied the transverse bars to the longitudinal bars. A man working on the grade passed up the individual transverse rods from

Text continues on page 92

(Left): New supplies of longitudinal rod are placed on the trailer. In foreground note spacer notches through which the rod is fed. (Right): Seen from rear, spliced reinforcement feeds down into position as truck moves ahead. Note form pulled along to screed out wrinkles in subbase.

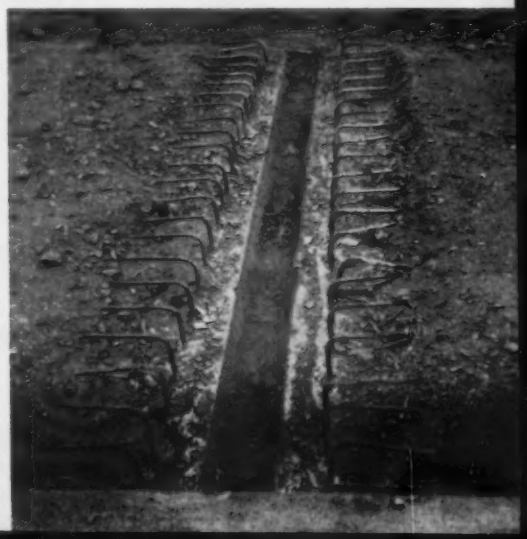


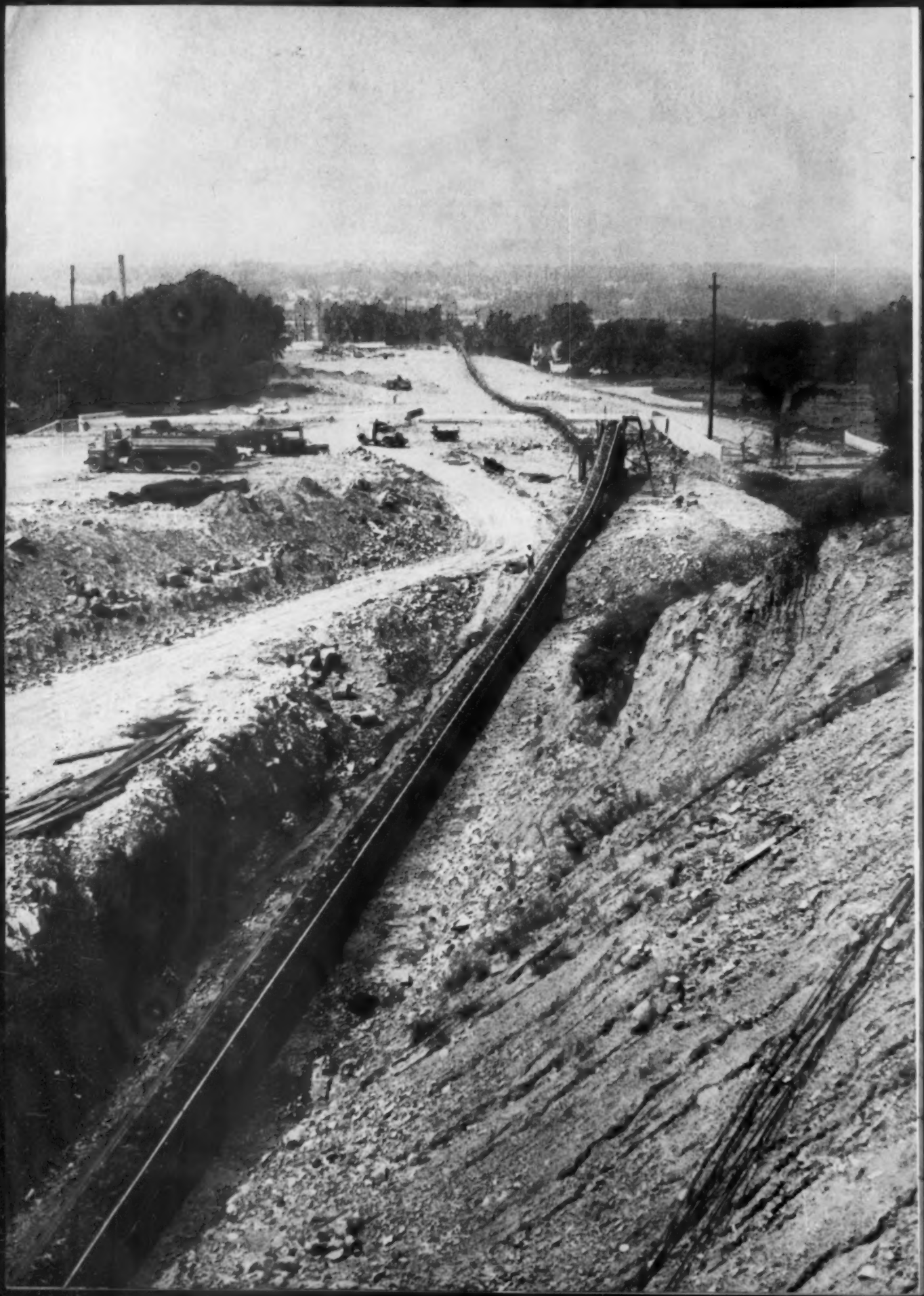
(Left): Foreman (back to camera) sees that the longitudinal splicers at left have finished their ties and is about to signal (with his left hand) the driver to pull ahead. (Right): A bundle of transverse rod is guided into its berth on the auxiliary trailer.

Reel which contains roll of splicing wire.

Steps in Handling And Placing the Continuous Steel

While rod supply on the trailer is being replenished, men go back to make missing transverse splices. (Right): One of four "anchors" at each end of Mengel's continuously reinforced contract. A concrete foundation 4 ft. deep and 2 ft. wide is poured the width of the lane with reinforcing spurs bent and placed as shown.





Looking west along the special Barber-Greene-designed rock conveyor which will handle 2,500,000 cubic yards of rock and earth in lieu of a two-mile bottom-dump haul.

Brewster Belts Rock Two Miles in Unique Freeway Grading Operation

Roads and Streets Staff Report

AN eleven-thousand-foot belt conveyor system is transporting rock from a big hill cut on a freeway job in metropolitan New Jersey. This is just one of a number of unusual items of method and equipment seen on the $10-million plus collection of road and bridge jobs held by Geo. M. Brewster & Son's Co. Inc., just off the George Washington Bridge out of New York City.

The Brewster work is part of the revamping and enlargement of the approaches to the big bridge. On the Jersey side, Brewster leads the show, having low-bid or subcontracted much work under the Port of New York Authority for the first half-mile off the bridge, and taken five jobs totaling over $40 million under the New Jersey state highway department, on to the west.

Rock excavation is a common denominator in this string of projects. With over 1,600,000 cu. yd. of solid diabase basalt (trap rock), along with substantial earth yardages, the company has tied several contracts into a single management and brought in much heavy equipment.

1. Top liner in Brewster's five-ring circus here is the special conveyor belt which has attracted throngs of visitors. The company was faced with making a wide, 90 ft. deep cut through a palisade, taking some 2,500,000 cu. yd. of earth and traprock to a dredged-out area over two miles to the west, where an interchange is to be built.

The conveyor which began operation early in September will run through 1962 with virtual round-the-clock operation. The system extends along the right-of-way of Interstate 95, which has been cleared and rough graded. The intermediate sections follow the ground contour except at overpasses, and are supported on 12" x 12" timbers spaced every 50 ft. The belts pass via heavy bridging over two roads and one rail line.

Before deciding to belt instead of truck this big long-haul yardage, Brewster officials and their consultant studied all job factors: With initial costs about the same as for wagons, the conveyor's salvage or reuse value affected the choice. Day-and-night operation was possible without slow-downs at flagged street crossings, and without disturbing the suburban residents. Also, only four to five operators are needed for the conveyors, compared with many truck drivers.

The conveyors were designed and manufactured by Barber-Greene Company. The 10,900 ft. long system comprises ten flights ranging from 50 ft. to 2,000 ft. It has a capacity of 2,000 tph and requires a total of 1,550 hp.

The conveyors were designed and manufactured by 60-in.-wide belt. All other conveyors have 42-in.-wide belts. Intermediate sections are primarily standard Barber-Greene 34-in.-deep, heavy-duty truss units. Special galleries were designed and fabricated for overpasses and transfer points.

Use chiefly of standard components greatly reduced engineering and manufacturing time, speeded shipping, simplified erection and will facilitate any shortening or lengthening needed.

The belts run at 610 ft. per min. on 3,600 Barber-Greene heavy-duty roller-bearing idlers; troughing idlers spaced 4 ft., return rolls 12 ft. Steel conveyor pulleys, shafts and roller bearing pillow blocks were furnished by Dodge Manufacturing Corporation. Head pulleys are 36 in. and tail pulleys 30 in. diameter, all

Shovel rock is crushed to 8-inch maximum size in an Allis-Chalmers gyratory crusher (at left), rock going thence over the conveyor seen following the right-of-way into the far distance.

The crusher is located on a temporary rock ramp, located part way down the big hill, designed to utilize gravity in feeding the conveyor.

with "Taper-Lock" hubs and bushings.

The Westinghouse conveyor drives include electric motors and parallel-shaft helical-gear reducers. To pick up the heavy inertia of the loaded conveyors smoothly and still keep belt tension to a minimum during starting, each flight is equipped with a Dodge Flexidyne Dry Fluid Coupling, installed between motor and speed reducer. This also serves as a torque-limiting device to protect motors from possible damage due to unexpected overload or jamming. A flexible cushion element built into the coupling compensates for shaft misalignment and absorbs shock and vibration.

By introducing this unique coupling into the drive system, Barber-Greene was able to design the conveyors to load specifications without resorting to more expensive starting equipment.

All conveyor belting used in the entire system is Barber-Greene brand, manufactured to this firm's specifications by Hamilton Rubber Manufacturing Corporation, division of Acme-Hamilton.

2. A companion feature here is a 54-in. Allis-Chalmers gyrating crusher. Set up in the right-of-way just out of the big hill cut, this crusher is fed by shovel and Euclid rear-dumps. The crusher reduces rock size to minus 8 in. and discharges onto a 50 ft. conveyor, first in the system, which acts as a large belt feeder to feed 563 ft. conveyor No. 1. The material then travels through to conveyor No. 9 which fills two large truck bins. The bins discharge into trucks which, in turn, deliver the material to the meadowlands being filled in.

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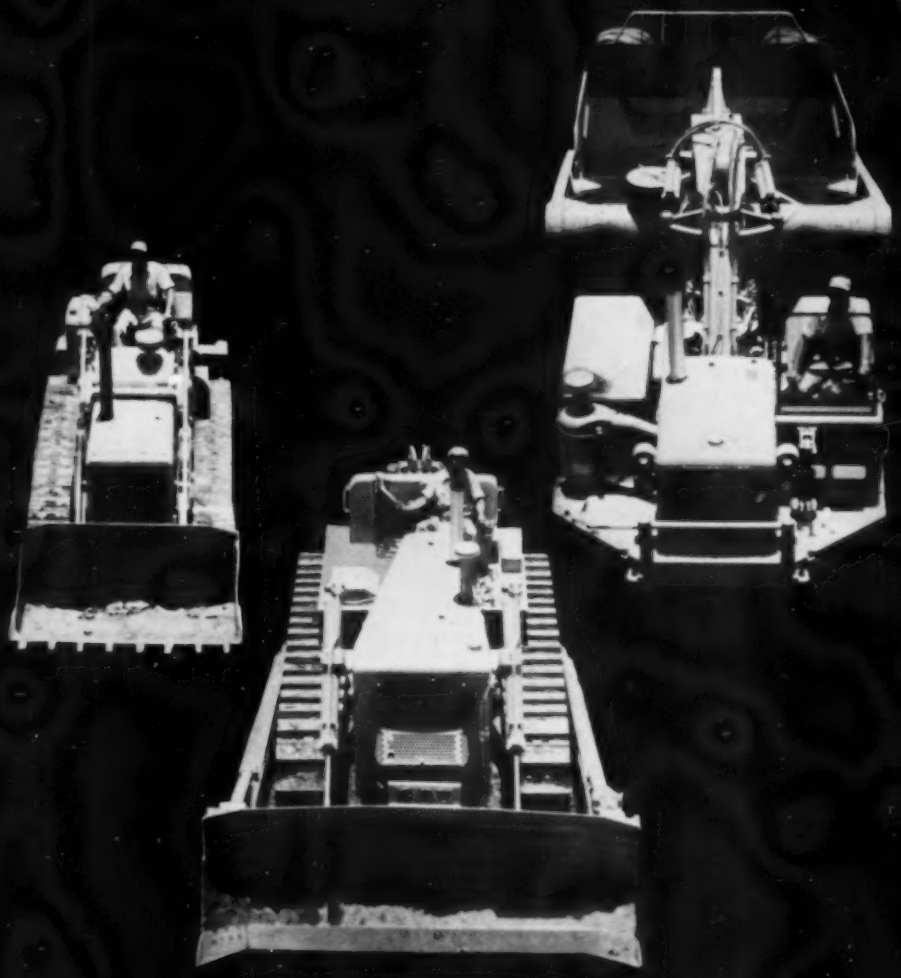


CATERPILLAR REPORTS

On the following pages:

Why three different Cat power shifts?

How loader power shift cuts cycle time . . .

Production test—D8 PS vs. D8 DD

"Hit the floorboard and let 'er roll"

How rugged is Cat power shift?

Why you get more production from a Cat power shift:

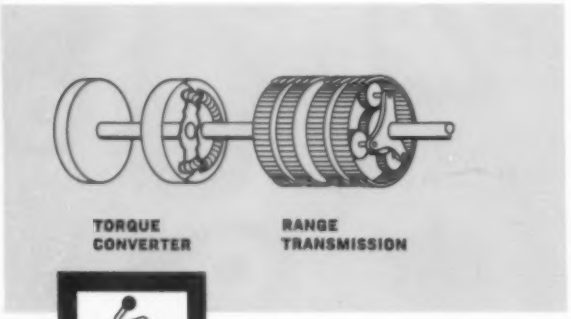
THREE DIFFERENT

THREE DIFFERENT

Any workable power shift transmission has great advantages over direct drive. By doing much of the operator's routine physical work for him, it reduces fatigue, lets him work faster and more productively.

So, if power shift is good, why not pick one proven type of power shift transmission and use it on all types of machines? Many earthmoving manufacturers do just this and come up with good results.

Unfortunately, "good" isn't necessarily "best." No one general purpose power shift transmission can get the *best* production out of every type of machine. So Caterpillar builds three different



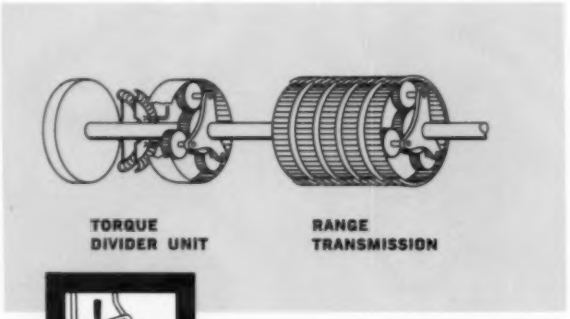
LOADER TRANSMISSIONS

Front-end loaders—both wheel and track-type—work on fast, short cycles. They crowd, dig, reverse and turn, dump, back away and crowd the pile again. They don't move far, but they move fast, cycling a couple times a minute. Shifting and bucket action must be fast and effortless if the operator is to keep up the pace all day. Maximum bucket power is needed to get full loads every time.

Full torque converter drive coupled with a power shift transmission is the combination for this application. It allows the operator to crowd the pile hard without pulling the engine down, thereby maintaining full power to bucket controls.

Travel is too short and variable to realize the efficiency of direct drive. The automatic matching of speed and torque to job conditions makes full torque converter drive the best. The operator need only watch the bucket and where he is going. When he is ready to change direction, he simply moves one short lever and he's off in the opposite way.

Power shift is standard on all wheel-type Cat Loaders and on the 977H and 955H track-type Loaders.



CRAWLER TRACTOR TRANSMISSIONS

Crawler tractor work has some of the features of loader work, plus longer travel. This application can use the advantages of both torque converter and direct drives. Take a typical job—dozing. Torque converter drive automatically provides the high torque multiplication without shifting to meet the changing load conditions while digging. But direct drive is better suited for drifting the load. Direct drive is more efficient, applying most power for pushing the load steadily for faster cycles, more positive control, greater economy.

Since there are advantages in both methods of drive, Caterpillar combines them in its power shift transmission for crawler tractors. Power is sent to a three-speed, directional transmission through a torque divider unit, with approximately 60% of engine torque multiplied by a converter and 40% bypassing it.

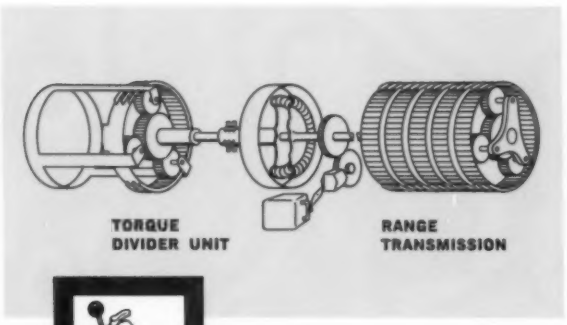
Single-lever power shifting provides instant response, up or down, on the go, in three speed ranges, forward and reverse. Direction can be changed instantly without stopping.

Power shift is standard on the D9G, optional on the D8H.

JOBS—
TRANSMISSIONS

application-matched power shift transmissions for its loaders, crawler tractors and wheel tractors.

Their basic components are similar. But each transmission is designed to get the *most* production from the type of machine it is used in by matching its particular operating requirements.



WHEEL TRACTOR TRANSMISSION

As in the case of crawler tractors, there are advantages in both direct drive and torque converter drive for wheel tractor-scrapers. Variable torque multiplication without danger of stalling the engine is needed when the going is tough, as during loading. But for running down the haul road, direct drive—and overdrive—is more efficient and economical.

However, a wheel tractor's need for torque converter action is considerably less than a crawler's. So in this version of the Cat power shift transmission, only 25% of the torque is multiplied by the converter while 75% bypasses it.

This single-lever transmission incorporates a speed-sensing device that automatically provides three types of drive to the three-speed range transmission—for nine speeds with just three shifts. The torque converter is used only in torque divider drive—where it is needed to keep engine speed high. The converter is automatically locked out of direct drive and overdrive in all three operating ranges for better efficiency.

Power shift is standard on the 630A and 631A, optional on the 619C.

Phil Whitehouse, Carpentersville, Ill., bought a 977H because he believed that the power shift would be a great timesaver and production booster. And he was right. The operator has even noted that it outproduces a direct drive loader about 30% in the morning, but the gap widens to 50% as the day wears on.

George Andruss, operator for Nelson Brothers, La Harpe, Kansas: "I've stripped 420,000 yards with this power shift D8 in 1190 hours. I figure I pick up about 10 minutes more production an hour compared to a stick shift tractor. And I still feel good at the end of the day. I also like the positive, direct drive feel you get with the power shift."

Frank Hess, co-owner of Hess Construction Co., Long Beach, Calif., says 631s climb hills better than any other machines he's tried. "Automatic shifting really pays off here. The operator doesn't have to worry about a thing—it shifts automatically to make full use of engine power and to keep moving without slowing down. They shift so quick you don't even notice the smaller grades."

How Cat **LOADER POWER SHIFT** cuts time...

1 Crowding the pile demonstrates the value of the Cat torque converter drive when coupled with power shift transmission. Full engine torque and power are transmitted through the torque converter in the transmission. Result: the machine may reduce speed rapidly yet keep pushing hard without slowing the engine, and maximum hydraulic power is maintained to get full bucket loads fast.

2 Fast reversing when bucket is full. With a full bucket, the operator is ready to back up. A simple flick of the wrist moves the power shift lever into reverse. At the same time, his right hand pulls back the lift lever. The automatic kickout then takes over, positioning the bucket at dumping height. Operator is free of all controls to give full attention to maneuvering the machine.

4 Fast dumping. A finger-touch on the transmission lever puts the machine in neutral, while the right hand moves the dumping lever. As bucket empties, operator puts bucket control into tilt-back position and flicks power shift lever into fast reverse. Bucket positioner again takes over, automatically tilting bucket back to proper digging angle as machine backs up.

5 Fast return. Operator watches where he's going—not the controls, quickly shifts to reverse as bucket dumps. Right hand pushes both bucket controls forward, kickout automatically positions bucket for digging angle. Then right hand is free for steering. From crowding the pile to backing from truck, the 955H "never stops"—and handling is effortless.

increases production

3 Fast approach after turning. Operator shifts small lever to forward in one easy movement. Again, response is automatic, practically instant. Cat power shift transmission can be shifted from fast reverse to full forward, without jerking, because of the modulated hydraulic control of its oil clutches. Shifting is always a one-hand operation—no clutching, no stopping.

"Controls are so easy to handle on our Cat power shift 955, the operator keeps up a pace—all day long—that would wear him out on old-style machines in a couple of hours"—reports Curtis Geoghegan, of Lyndon, Kentucky.

Loaders call for fast shifting (and fast bucket action). That's why automatic matching of speed and torque, provided by full torque converter power shift, best matches this type of machine to job conditions. How well does it do?

Curtis Geoghegan expects more from any new model. He figured the power shifting 955H would produce about 25% more than the old direct drive model. "That would be more than enough to make it a good investment," he said. "But were we surprised! This loader is so fast and easy to operate we are getting at least 50% more production—all day long!"

Watching his loader work shows why he gets this increased production: plenty of power, live action hydraulics, automatic bucket controls and fast, job-matched power shift.

CAN YOUR WHEEL LOADER MATCH THIS?

17 tons loaded in 1.3 minutes, that's average production of five trucks loaded at Nello L. Teer's quarry near Durham, North Carolina.

It takes more than a good power shift on a wheel loader to consistently produce more. Compare Nello L. Teer's 2¾-yard Cat 966 with another make loader (with a bigger bucket) on the same job. "I can load up to 100 tons per hour more with the 966," said the operator. The reason? "It's the fast power shift transmission, fast lift and drop of the bucket, fast steering and short turning radius, and the automatic bucket positioner."

The whole machine is *fast*—it practically "bounces off the pile." And with this speed there's an ease of operation that keeps the operator feeling fit even at the end of the shift. The 140 HP 966 is the largest of three Cat wheel Loaders.

How *much* does a Cat Crawler Tractor *power shift* increase production?

The Cat D8 Series H has proven its cost saving and production superiority over other tractors on job after job. But how does the power shift D8 compare with the direct drive—does the additional 7% hourly owning and operating cost pay for itself?

Experience and many tests have shown that it does—by a wide margin. On one recent test, both models were operated side by side to compare dozing ability:

Material—clay with low sand content

Conditions—pit 50′ long; drift distance 150′

Average hourly production—direct drive: 145 b.c.y.
power shift: 185 b.c.y.

You might not get this same yardage on your job, but you should get the *27.6% increase!* And, even considering the higher cost of the power shift, it still shows a cost advantage of 17.8%.

What made the big difference? It wasn't the load on each pass. Each machine averaged 4.5 yards per trip. But the power shift D8 made *more trips* in the same time.

With power shift, the operator had practically effortless control. Under his left hand was one small lever that let him change direction or speed range in a split second—no clutching, no lost time. The operator started digging in "second"—then shifted down on-the-go to "first" to get a full blade load in a hurry. Just a flick shifted it back up to "second" for fast drifting. Shedding the load, another easy move swung the lever around into high-speed reverse for a fast return. Quick, easy shifting gave shorter cycle times.

Reduced operator fatigue permits the efficiency of Cat power shift Crawler Tractors on many jobs to be estimated at 55 minutes per hour instead of the usual 50 minutes.

Not only is the operator more efficient, but machine efficiency is increased by the exclusive torque divider design of this power shift transmission. This gives all the advantages of torque converter drive while retaining the desirable characteristics of a direct drive machine.

But the only place to prove the advantages of the Cat power shift is on *your* job. There you can compare performance with present rigs—see how much it will do for you.

"HIT THE FLOORBOARD AND LET 'ER ROLL"

That's how to get the most out of Cat wheel Tractor power shift ...how it will best adjust automatically to job conditions.

"There's only one way to drive this machine: push it to the limit all the time ... hit the floorboard and let 'er roll. When you keep a heavy foot on the accelerator, that automatic shift does most of the work for you."

Good advice from roadbuilder O. W. Howard of Madisonville, Texas. "At first," he says, "you have to kind of get used to a big rig that's so easy to operate. But it doesn't take long on top of the 631s before you ride 'em for top production."

Cat wheel Tractors *are* easy to operate—you can push them hard in any terrain, under all ground conditions. The shift dial tells you when to shift into one of the three basic speed ranges, and the automatic transmission shifts up (or down) through three types of drive in each range for a total of nine forward speeds—more usable speed than any other rigs on the market. "Our 631s," says Howard, "give us the exact speed for every job condition we encounter practically without effort—no clutching, no hunting for the right gear."

In sticky going on Howard's 2.5-mile section of Interstate 45, his 631s have been sprinting out of the cut with 22-yard average loads of gummy, hard-to-handle Texas dirt. "Power shift does the trick," he says. "That 631 pulls full horsepower out of its diesel whether it's in the cut or barreling along the haul road."

Nothing too complicated about the Cat power shift either. It's a simple mechanical system giving you a torque converter's ability to balance speed and power and the efficiency of direct drive and overdrive. The converter in the exclusive torque divider eliminates engine stalling during loading,

keeps engine speed high. And when you're shifting up it cushions the power train. For high-speed hauling the transmission also provides direct drive and overdrive in each range for fast acceleration and a top road speed of better than 31 MPH on the 631—over 40 MPH on the 630.

THREE-TO-TWO PRODUCTION PAYOFF

Speed like that pays off: Arthur Fleming, 631 operator for Armstrong & Armstrong, Roswell, N. M., highway contractors, says he's been getting three trips for every two by competitive units on Armstrong's 7-mile Interstate 10 spread. In the pit, pulling away from the pusher, he shifts up to 2nd range in 100-150 feet, on to 3rd range in 250 feet on the level in packed sand. He accelerates coming out of the pit, up a 6% grade.

"Automatic shifting is a big help on the fill," says Fleming. "I can watch where I'm going ... makes it easier to spread the material evenly." (State highway specifications call for 4-inch compacted lift.) "The 631 gives me a smooth, stable ride," he continues. "I can stay in my seat at top speeds over ground so rough you have to slow down other machines. The scraper is easy to load ... that new cable control (it's air actuated) helps me to pump in good loads every pass."

Speed ... power ... maneuverability ... stability ... easy operation ... unitized design for servicing ... they're all there in Cat wheel Tractors to give you greater productivity and lower costs. Power shift, providing nine speeds with only three shifts, is standard on the 631 and 630, optional on the 619.

HOW RUGGED IS CAT POWER SHIFT?

Well, after 6100 hours of this...

a factory check showed this...

The Ohio River Collieries Co. liked Caterpillar's offer: namely, to trade them a power shift transmission for the old one in their D9E shown above.

Obviously this sounded good to the Cheshire, Ohio, firm. Their particular D9 had seen 6100 hours of the heaviest kind of duty. They'd worked it 22 hours a day, seven days a week, ripping and 'dozing sandstone, shale and a very hard cherty blue slate.

But it was a good proposition for Caterpillar, too. As part of a continuing program of power shift transmission research and evaluation of field performance, regular spot checks are made of transmissions that have seen rough field service.

How had this one stood up? Measurements showed that wear on all clutch surfaces and gears was slight—dimensions were still within allowable wear, except for the pinion gear, which showed normal spalling after this much use.

For the best in new and used machines, and the best in parts and service—see your Caterpillar Dealer

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

Form 717-34361-DE128

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On Colorado project, making a quick check of the instrument function without removing the instruments from the car.

Nuclear Soil Testing Gets OK in Colorado

Contractors and state highway personnel voice acceptance of new speedy method of securing compaction and moisture verdicts in the midst of grading.

Construction workers on Highway 50 in Colorado Highway District 3 no longer show a flicker of interest when the soil testing car rolls up to the site. But four months earlier when the test crew first unloaded their nuclear in place testing instruments instead of funnels and bags of sand, they collected quite a spectators' gallery.

The nuclear instruments, known as the d/M-Gauge system, are now in routine use in Colorado state highway work for compaction control on earthwork sub-bases and base courses on the Sapinero East and West Project on the western slope of the continental divide in Colorado. The $3.7 million job involves relocation of U. S. 50 around the site of the Curecanti Reservoir. In the words of district engineer Ralph McCoy, who initiated the nuclear method in his district, "the decision to use nuclear testing for compaction control on the Sapinero Project and others in this district was certainly not a snap judgment. The advantages of the method were clearly shown by our department's materials laboratory in Denver. The wide variety of material types at this site, some of which contain over 35 percent rock, indicated to us that the older compaction tests simply could not do the job.

Colorado's use of the nuclear method for routine compaction control is the culmination of a joint development program set up back in 1959 between the Colorado Department of Highways and the Bureau of Public Roads.

Robert E. Livingston, Colorado's Planning and Research Engineer, was the father of the project; the evaluation work was carried out by Wayne R. Brown, and H. W. Wal-

ters under the supervision of E. G. Swanson the staff materials engineer, and his assistant and C. R. Lowrie.

The completion of this evaluation, described in detail in a report recently issued, has resulted in two programs for the research group where one existed before. The first is the training of district test crews in the use of the new method for routine testing of soils and aggregates. The second program involves the further study of the d/M-Gauge system and other nuclear methods to discover further applications to Colorado highway problems.

According to Livingston, "there are many standard highway tests which are so slow and cumbersome that their results make interesting history and that's all. The results are received too late to contribute to the necessary information on which decisions can be made.

"All of us in the highway field know full well that both the quality and quantity of testing must go up drastically to insure the desired quality and rate of progress in our Interstate and other federal aid roads programs. But we also know there is simply not sufficient manpower or time available. We must therefore be quick to recognize and evaluate new test methods which hold promise of decreasing the time and improving the accuracy of the inspectors' work."

No starry-eyed visionary, Livingston went on to say, "When we first heard of the nuclear method in Colorado we didn't know a neutron from a narcissus, and we didn't care. All we wanted to know was whether the method could be used in the field as a practical tool by average test crews. We were not interested in the instruments as laboratory play-things nor as the basis of a life-time research project. Nor were we interested in discovering all of the things the instrument's *couldn't* do.

"As a result, we pushed the method out into the field rather early, after only a brief evaluation in the laboratory. The instruments were transported over 5,000 miles in the back of a CDH station-wagon over construction grades. That the instruments were able to take that kind of punishment was as significant to us as their ability to measure moisture or density accurately on known samples."

An interesting outcome of the early d/M-Gauge evaluations was the fresh realization that conventional test methods must be handled with real care to give reliable results. Early failures to obtain correlation between the d/M-Gauge and conventional methods occurred through lack of accurate calibration and to errors made in collateral tests using conventional methods. "What really surprised us," according to Wayne Brown, "was that although a given tester can get consistent results, himself, he has real difficulty checking another tester. To me, the chances for errors in human judgment and techniques are much greater in the conventional than for the nuclear method. To say this another way, the nuclear method is much more human-proof."

"Also," said Brown, "we realize that there are certain kinds of materials on which conventional methods break down completely. For example, on plastic materials, hole deformation in either the sand or balloon method is a nearly insurmountable problem. Since you don't have to dig holes with the nuclear method, differences in material types are much less serious."

In the past, compaction measurements on very rocky material were so difficult that inadequate testing was done. Just because a material contains a large percentage of rock you cannot assume that good compaction is unnecessary if there is a significant percentage of plastic material in the mix. By the use of the d/M-Gauge, we have been able to determine the maximum compaction and optimum moisture in the field on small areas within a few minutes, as a guide to the preferred compaction treatment of the whole area. This type of approach would be impossible with the older methods because of the difficulty of digging holes and obtaining accurate densities in the time required.

The report issued by the Colorado department expressed doubt of the ability of the conventional methods to cope with problems introduced by modern high-speed construction methods:

1. Present density and moisture control methods are fast becoming rated as inadequate, especially with the ever-increasing number of high-speed and large-capacity earth-moving machines being used in constructing highways today. These methods many times cause costly and needless delays during construction because of the time-consuming procedures involved. The trend in some instances is that testing on the project has become incidental instead of having criteria status.

2. It has been stated that a destructive kind of test, such as a field density, may well change the draining properties of the surrounding soil throughout a two-foot radius. Non-destructive testing does not disturb the construction in any way.

3. With the advent of end-result type specifications (for which Colorado has been a leader), in-place density information is required in coarse, open-grade materials. Standard methods of obtaining this information are very difficult and often inaccurate in this type material.

An outstanding result of the Colorado experience was the proof, by careful work, that the density and moisture of a wide variety of Colorado material types from clays to aggregate may be read from a single calibration curve with reasonable tolerances (one for moisture and another for density).

Other workers have repeatedly voiced the fear that a series of calibration curves would be necessary. Much of this fear is based on the knowledge that conventional methods *do* vary with material type because of the difficulties of digging a well-defined hole and measuring its volume in a wide variety of soil types.

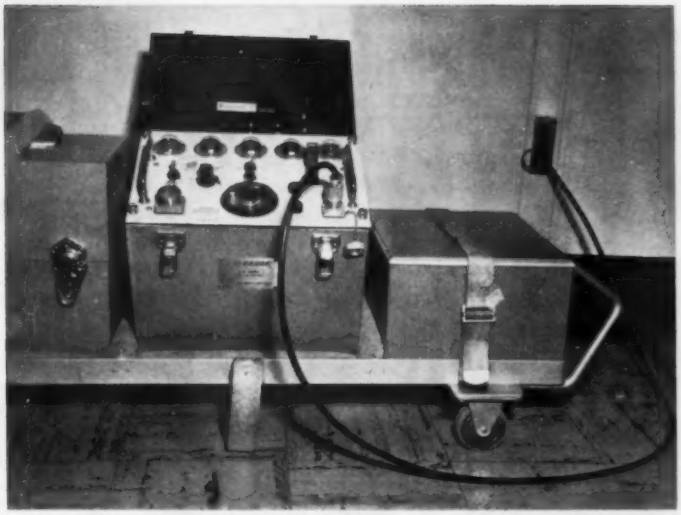
The conclusion regarding the nuclear methods are summed up in this report as follows:

1. Nuclear density and moisture determinations are possible as well as practical for field use.

2. The nuclear device concerned in this report is mechanically and electronically well built.

3. The d/M-Gauge performs well within statistical tolerances claimed by Nuclear-Chicago Corporation, the manufacturer.

4. Scaler performs satisfactorily under a large variety of conditions.



The scaler which provides data read-out is a battery-operated instrument with its own charger. During off-hours it is re-charged by plugging it into an ordinary wall outlet.

Making a field compaction check with the nuclear method.

The d/M Gauge is transported in a carrier in the back of highway department station-wagon. At many test sites, the scaler may be left in place and the gauges taken out, one at a time, for measurement.

5. The moisture probe results compared favorably with conventional oven-dried moisture samples regardless of soil or aggregate type in 95% of all comparison tests.

6. The density probe can be calibrated by either of two methods:

(a) Calibrated to a series of field sand density tests.

(b) Calibrated to determine the most accurate weights per cubic foot possible through the use of solid laboratory standards, of known weights, and subsequent test results taken at face value. This department hopes to pursue this type of calibration further as it seems to be the more accurate of the two.

7. The density comparison tests were within three lb. per cu. ft. wet density on an average of 84 percent of the comparison tests when calibrated to one operator's sand density results.

8. Contractor and Colorado Department of Highways personnel acceptance was excellent. Much enthusiasm toward nuclear technique was encountered during the field phase of this research program.

9. Nuclear *dry* density reporting is accomplished in 12 to 15 min.

10. Personnel exposure to irradiation when operating nuclear device in the recommended manner is considered to be negligible. Effects of this small amount of radiation were found to be nil.

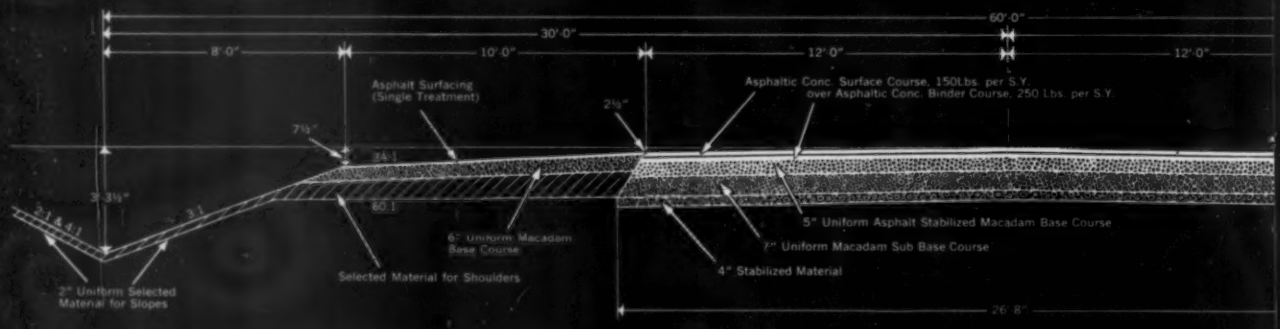
11. Interested and competent sub-professional personnel, having a background in materials testing, can be trained in three days to operate the nuclear testing equipment effectively.

Airport Paving Bid Only 63% Of Estimate

A paving contract at O'Hare airport in Chicago has been awarded to Arcole-Midwest Corporation at a bid price of $6,317,000. The contract was $3.8 million below the city engineers' estimate. The Skokie, Illinois, contracting firm was able to take the work at this price, according to a news report, because of the firm's own stone quarry as compared with prices from Material Service Corporation, chief supplier of stone for other city work. The contract work includes 120 acres of paving around the airport's huge new terminal.

New DEEP STRENGTH Asphalt Section of South Carolina Interstate No. 26 extending from Route 296 to U.S. Route 176.

MACADAM SUBBASE course is spread and compacted to 7-inch thickness.



New Section of South Carolina

Interstate No. 26 uses DEEP STRENGTH Asphalt Construction

The expanding pattern on the National System of Interstate and Defense Highways is nowhere shown to better advantage than in the State of South Carolina, particularly regarding mileage under contract and mileage constructed. Of the approximate 680 Interstate miles in this state, some 325 miles are under contract. About 180 miles are in the latter stages of construction or open to traffic.

This record is the result of a combination of important factors, among which may be mentioned careful planning, an aggressive and intelligent group of State Highway Engineers, and the adoption of *stage construction* wherever feasible. Last but not least, the use of Asphalt in combination with local aggregates to reduce costs, speed construction, and give the State a highway system which is durable, smoother-riding, and well able to support any traffic loads of the foreseeable future.

An excellent example of South Carolina Interstate Highways is a section of I #26 in the vicinity of Spartanburg. Rainfall and temperatures are normal for the Southern region, and frost conditions are not a serious factor. The design includes a selected top-soil sub-grade, reinforced with crusher-run stone, an Asphalt-primed macadam subbase course, an Asphalt plant-mix macadam base and an Asphalt concrete binder and wearing course.

Asphalt base was a plant-mix macadam with aggregate graded from the No. 4 sieve to 2½ inches, heated and coated with 3% to 4% of 85-100 penetration Asphalt, laid 5 inches thick in one layer. (Recent contracts specify a smaller stone constructed in two layers.)

Shoulders follow the general criteria for the Interstate system, with 10-foot surfacing for the outside lane and 3-foot for the inside lane. Features that materially reduced shoulder costs were the use of selected material for the foundation course with a 6-inch uniform macadam base and an Asphalt single-surface treatment with ½-inch stone for cover.

Compaction was performed on the pavement structure with three wheel steel rollers, high contact pressure pneumatic tire rollers and tandem steel wheel rollers.

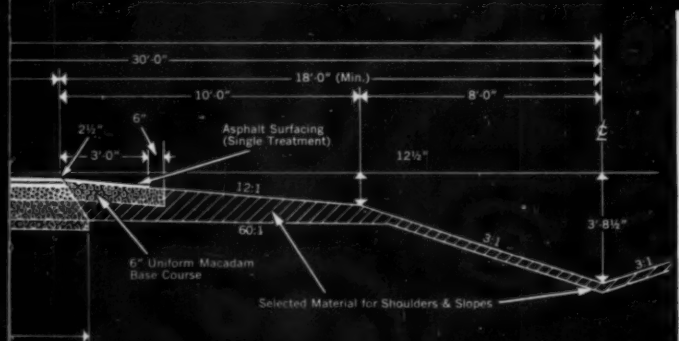
A study of the section below shows how this DEEP STRENGTH Asphalt design assures heavy-duty strength and durability. This application of DEEP STRENGTH Asphalt design principles is the result of many years of study, research, and experience in using local materials in combination with Asphalt by engineers of South Carolina's State Highway Department. Their invaluable engineering experience has saved many millions of taxpayer-dollars and provided extra mileage of Interstate Highways.

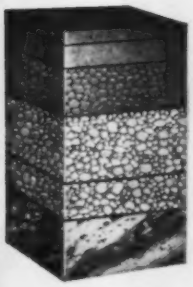
A new edition of the ASPHALT HANDBOOK incorporates all the Advanced Design Criteria implied in the term DEEP STRENGTH Asphalt Pavement. Write us for your free copy.

MULTI-LAYER SECTIONS consolidated for smoother riding by high contact pressure pneumatic tire rollers.

36-foot DEPRESSED MEDIAN with deep longitudinal drains assures good drainage and lowered water table.

THE ASPHALT INSTITUTE College Park, Maryland





HERE'S THE DEEP STRENGTH DESIGN OF SOUTH CAROLINA INTERSTATE NO. 26:

—A.	A. Asphalt concrete wearing course	1½"
—B.	B. Asphalt concrete binder course	2½"
—C.	C. Asphalt stabilized macadam	5"
—D.	D. Asphalt primed macadam subbase course	7"
—E.	E. Stabilized material	4"
—F.	F. Subgrade or Improved Subgrade	—
	TOTAL THICKNESS	20"

Rebuilding sheepsfoot tampers at J. A. Thompson & Sons involves use of rings cut from iron pipe. These are sledged over the worn tamps to serve as collars for the build-up.

With a semi-automatic stinger and using fabricated tubular hard facing wire, the welder fills in the recess between the worn tamp and the ring. When in use, the steel ring wears away relatively quickly, leaving the extremely hard build-up material as the tamp. Rings of various sizes are used to bring tamp heights out to 8½ in. from the drum.

Contractor Rebuilds Parts Under Close Cost Control

The well-known Southern California contractor, J. A. Thompson & Sons, is cutting maintenance costs and keeping equipment on the job longer through a carefully pursued hard facing program handled by the company's welding shop.

The firm uses positioning equipment, a semi-automatic welding machine and alloy wires chosen for specific types of wearing conditions to rebuild tractor rollers, idlers, sprockets and sheepsfoot tampers so that they double the life of the item at less than 50 percent its replacement cost.

"We won't hard face," explains maintenance superintendent Bob Moodie, "unless we know that total hard facing costs, including labor and materials, will not exceed 50 percent of the replacement cost. We've found if we follow this rule, in-plant hard facing is kept on a profitable basis.

This means that track rails and other large items that can be efficiently handled by large automatic welding machines are sent out to custom shops. The Thompson & Sons shopmen concentrate on the smaller cylindrical parts that can be handled on their semi-automatic welding unit, and on specialty build-up requiring hand work and mating to existing equipment.

The firm has had particular success in the build-up of rollers, idlers and sprockets—items that frequently wear heavily and demand precision rebuilding.

This success is attributed to Thompson's many years of experience in rebuilding and hard-facing and the close attention given to three major points: (1) selection of the proper alloy to meet a given set of wearing conditions; (2) preparing the work piece for welding; (3) correct welding procedure.

In the case of track rollers and idlers—the most commonly rebuilt parts—Thompson uses a chrome-manganese-moly alloy providing a flawless deposit with a low coefficient of friction. The deposit has a Rockwell hardness of about 40 and provides an excellent mating surface for the track rails, a factor often overlooked in determining the best alloy for applications of this type.

Before welding, rollers and idlers receive a double steam cleaning to assure that grease and oil are removed, not only from the outside of the part but from inside the bearing housing to eliminate smoking during the hard-facing operation. Rust and other contaminants are also removed.

With the roller on the positioner, the wearing surfaces are carefully gauged to determine the exact amount of build-up. Templates are used to ascertain final dimensions.

Thompson's weldor-operators give utmost attention to bead contour which is governed by four basic factors: voltage, amperage, rotating surface speed and lead. A higher, narrower, bead with a 50 to 60 percent overlap is preferred because it results in a smooth surface deposit that permits the part to go into service as welded. Alloy wire manufacturer's recommendations for voltage and current are closely adhered to. Rotating travel speed is generally set at 30 inches per minute.

At least two passes of wear-resistant alloy are deposited on the roller treads. The first pass results in some dilution with the base metal, minimizing the effect of the hard metal overlay. The second pass—and subsequent layers—result in a true hard metal surface and provide longer service life.

Flanges, one of the most vulnerable areas on tractor rollers, are rebuilt with the same alloy to prevent premature failure.

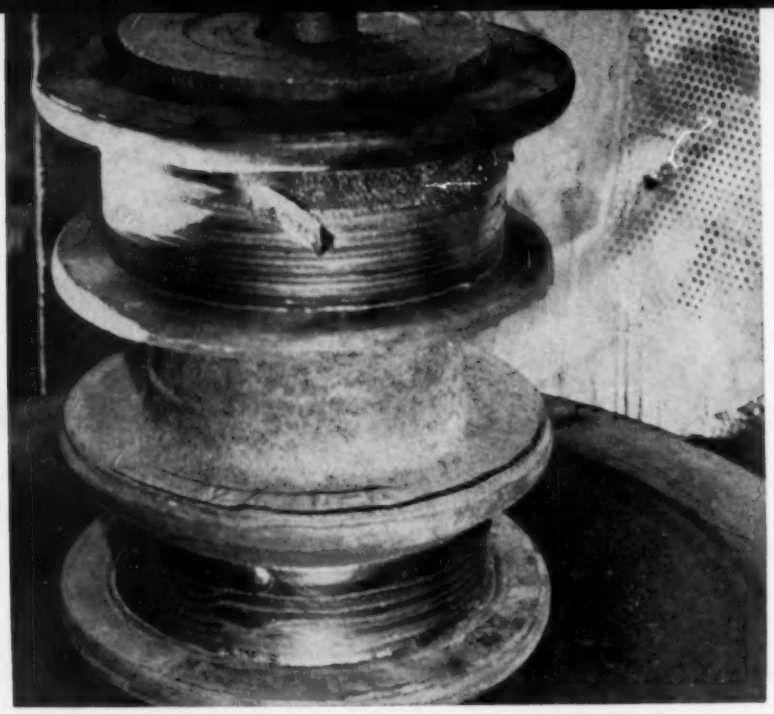
"We watch these rollers when they're on the equipment," notes Moodie. "We find that if wear exceeds ¼ in. (⅛ in. on each side) we're getting to a point where rebuilding costs are going to be relatively expensive and perhaps not too satisfactory. We're counting on a roller that will last as well as a new replacement."

Sprocket Reclamation

When rebuilding badly worn sprockets and other drive system gears manually, weldors return the part to within two passes of finish dimensions with a high strength, ductile build-up alloy such as Stoody Build-Up. This provides a suitable foundation for the final two passes of hard-facing alloy designed for metal-to-metal wear and high impact. Here, again, is another example of Thompson's thoroughly planned program.

Bob Moodie explains that the build-up alloy is necessary to provide a sound base for the somewhat brittle hard metal overlay. Moodie illustrated his point by placing a piece of glass on a rubber sponge and applying pressure to the glass with a gloved

Part of the rebuilding cost is in the flux used in the submerged process. J. A. Thompson & Sons salvage it all. Unused flux drops through the screens into a bin below and caked material is sent out for recrushing before re-use.



Careful bead control on this roller has resulted in an overlay job that requires no finishing and will double the original life of the roller.

finger; the glass shattered. By trying the same test with the glass on a steel base, it did not break.

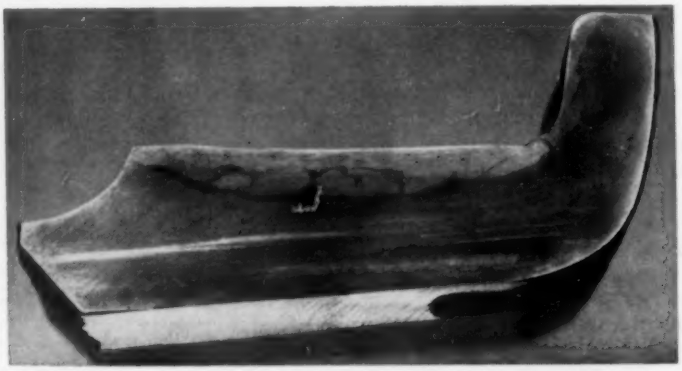
Hard-facing overlay layers should be kept at a minimum, three to four passes at most, generally. Moodie explains that the old adage, "if a little will do the job, a lot will do a better job," is not necessarily true.

Another result—not necessarily a reason—when using Build-Up to restore badly worn parts to the hard-facing stage is the savings involved. Build-up alloys are less costly than high alloy hard-facing materials.

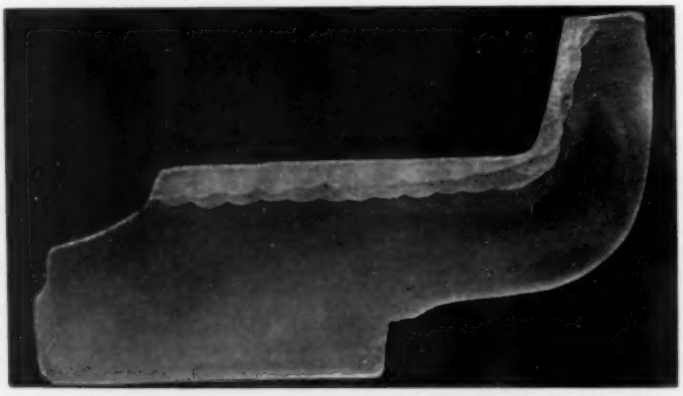
Novel Sheepsfoot Rebuilding

Thompson has a unique way of rebuilding worn tamper feet on sheepsfoot compactors. Short cut lengths of ordinary used pipe are sledged on the worn tamp ends and abrasion resistant Stoody 121 is weld-cast into the void until the tamp is brought out to the desired size. Inasmuch as individual tamp wear varies, Thompson stocks pipe sections ranging from 1" to 4". This application is done semi-automatically in less than half the time it would take to do the job

Continued on page 74



Wide, sloppy beads and improper cleaning before beginning overlay work caused overlay failure of this roller. Small holes in the weld metal are marks left by a Rockwell hardness tester.



This roller was properly rebuilt as noted by narrow beads with tight step-over. It's as good as the original product.

Why you should always use **STOODY BUILD-UP** to support a **HARD-FACING OVERLAY**

Worn parts are sometimes rebuilt with mild steel followed with an overlay of hard-facing. This procedure is like trying to support a thin glass plate on a sponge. *Poor compressive strength in the supporting base causes cracking and spalling of the surface alloy.* To insure a proper base use STOODY BUILD-UP... *it does a job mild steel can't approach!*

SEEING IS BELIEVING—Here are three ¾" diameter test pieces of different analyses, each submitted to the same 200,000 lb. compressive load.

No. 1 E-6010 DEPOSIT—Under pressure it has mushroomed to almost half its original height.

No. 2 E-7010 DEPOSIT—Somewhat better than E-6010 but still inferior for the job.

No. 3 STOODY BUILD-UP DEPOSIT—Has still retained virtually all its original height; shows minimum deformation.

STOODY BUILD-UP CHARACTERISTICS

Besides high yield strength, STOODY BUILD-UP provides good ductility; RC hardness ranges from 21 to 34 (depending upon application procedure). Can be deposited in a higher useable current range; up to 275 amps with 3/16" electrodes. Arc is smooth and stable. Smoke and spatter loss are minimum. Beads lay smoothly and high buildups can be made in a single pass. STOODY BUILD-UP offers the highest burn-off rate in the industry—61.8 ft. per hr. Deposits up to 6.30 lbs. per hr., higher with larger electrode diameters... results in less cost per applied pound. Deposits are machinable.

WHERE TO USE STOODY BUILD-UP

- As an underbase for hard-facing overlays
- For restoring size to any low alloy or carbon steel part
- As a final deposit to parts subject to high impact and compressive loads
- As a machinable deposit on steel shafts and slow turning gears

COST? Lowest in its field per pound of deposited metal—*by far the most efficient electrode for the job!*

SEE YOUR STOODY DEALER—He carries full stocks of STOODY BUILD-UP. Check the yellow pages of your phone book or write direct.

STOODY COMPANY

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...for more details circle 330 on enclosed return postal card

Mack-drawn hoppers at the pit are loaded with 25 tons of aggregate. They haul steadily on 9-hour shifts.

Rolling out of home base at Greenville, Ohio, one of American Aggregates' Mack tractors delivers electrical equipment for a subsidiary company, Greenville Mfg. Works.

At American's Ft. Jefferson ready-mix plant Mack mixer units take on 6-yard loads of concrete for local delivery.

Where performance counts—

Moving big tonnage for American Aggregates Corp.

Throughout the Ohio Valley, the Mack trucks of American Aggregates Corporation are a familiar sight. In addition to being the country's largest sand and gravel suppliers, the company manufactures diverse products ranging from ready-mix concrete to electrical equipment. These broad operations have one thing in common—a reliance on Mack trucks and tractors to handle the many and varied hauling assignments.

Says American Aggregates' president, Mr. Edward Hole, "We've used Macks for over 20 years, so we speak from experience when we say that these trucks are capable of handling efficiently any hauling job we've ever tackled. Their performance is tops wherever we use them, and there's never been the slightest question about their durability, ruggedness and economy—4 mpg on our gas units and 7 mpg on our diesel-powered models."

American Aggregates' Ft. Jefferson sand and gravel operation is a model of efficiency. Bottom dump trailers hauled by Mack B60 series tractors, run 25-ton loads of aggregate over well kept haul roads from pit to processing plant on a 9-hour-a-day schedule . . . average nearly a quarter of a million tons a year. After processing the aggregate, Mack dumpers make deliveries to customers and to American Aggregates' big ready-mix operation where 6-yard Mack mixer units handle concrete deliveries.

Modern, efficient, high-volume operations like these depend on modern efficient equipment to keep operating costs low. Macks contribute to high efficiency because of their outstanding performance characteristics. Mack Thermodyne® gasoline and diesel engines provide plenty of power for fast get-aways under full loads. Traditional Mack construction throughout reduces downtime and maintenance.

These are basic reasons why Macks are first choice where profitable operations rely on truck performance . . . why a Mack will pay for itself again and again by delivering top work capability per dollar invested. Your Mack representative is qualified by knowledge and experience to help you determine the Mack models that most economically meet your trucking needs. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

MACK
FIRST NAME FOR
TRUCKS

MACK
for over 8 straight years
NO. 1
by far in sales of diesel trucks

8309

Old bridge across Massie's Creek in Greene County, Ohio, is replaced by 18-ft.-diameter Armco Multi-Plate designed by new ring compression method.

Showing the careful tamping of backfill in the early stages.

Research Produces Bigger Metal Culverts

A research development that makes possible the construction of giant corrugated metal pipe-structures is announced by Armco Drainage & Metal Products, Inc.

Expected to broaden the applications for corrugated metal structures, the development is a method of design and construction which (1) offers simple, mathematical analysis of the behavior of a corrugated metal conduit enclosed in compacted fill; and (2) allows these structures to be built far larger and lighter, and also permits higher over-embankments than previously thought possible.

The Armco research involved design and construction of more than 30 test structures in diameters from 16 to 24 ft., with steel-plate walls as thin as ⅛ in. Many state and local highway departments and railroad companies participated. Most of these test structures served as replacements for old bridges or as underpasses on the federal Interstate highway network. Some have been used as stockpile reclaiming tunnels.

According to Howard L. White, Armco's chief sales engineer, the new development is based on a method of design which analyzes the corrugated metal structure encased in compacted backfill as a thin ring in compression. Until now, designers had not made structural analysis of corrugated metal structures because of the complex calculations. Designs were based largely on gage tables, derived from experience. Now however the ring compression analysis offers a simple formula for computing the load transmitted to the pipe wall, from which the proper gage of steel can be determined.

The ring compression study offers the following additional advantages, according to Armco.

(1) It shows that pipe-arches can withstand loads equal to those of round structures.

(2) It points up the importance of proper backfilling.

(3) It offers a means of closely estimating the reaction pressures of soils, essential in the selection of proper backfill material.

(4) Permits reliable design of arch footings by providing data on reaction pressures.

(5) Shows the contractor he can eliminate vertical or horizontal strutting during construction by close control of backfilling.

According to White, a corrugated metal pipe installed in well compacted backfill acts as a thin ring in compression with uniformly distributed forces acting along the circumference. This is expressed algebraically as the "hoop tension." Mathematically, therefore, the intensity of compression in the ring, from which a structure is designed, is equal to the intensity of external radial pressure times the structure's radius. External radial pressure is determined by considering the pressure on top of the structure as equal to the height of fill times its density plus live load.

Armco's research re-emphasizes the importance of proper backfilling on the strength of corrugated metal structures, and of selecting drainable material free of large rocks, lumps or frozen material. Also the need for alternate placing and tamping of 6-in. lifts under haunches and close to the pipe, and thorough compacting of remaining fill near the pipe with vibrating or mechanical equipment. Mr. White commented that careful backfilling and compacting actually saves money for the contractor, by allowing early completion and acceptance of the structure, thus making possible free movement of heavy earthmoving equipment over the structure.

An example of a large-diameter structure designed and built according to the ring compression method is found in Greene County, Ohio. Here the prohibitive cost of replacing an old steel creek bridge prompted Armco engineers to suggest a giant corrugated metal culvert, designed and built by ring compression techniques. With full cooperation of county engineer Fred R. Lemcke, an 18-ft.-diameter, 7 and 10 gage multi-plate structure—much larger and lighter than shown in present gage tables—was designed to carry the road diagonally across the river bed. Final design called for a 204-ft. long structure 5 percent ellipsed.

Because of the large size of the structure, backfilling and compaction were systematically carried out to avoid the use of bracing. The foundation was first stabilized with a layer of crushed stone, then erection proceeded rapidly. Granular backfill material was laid in 6-in. lifts and compacted by three separate methods—a pneumatic tamper close to pipe walls, a vibrating tamper just beyond, and finally a sheepsfoot roller for the remainder of the fill.

Smoke pouring from the bearing of the heated roller makes it difficult for the operator to watch the bead closely. It's the main reason why bearings should be carefully steam cleaned before welding begins.

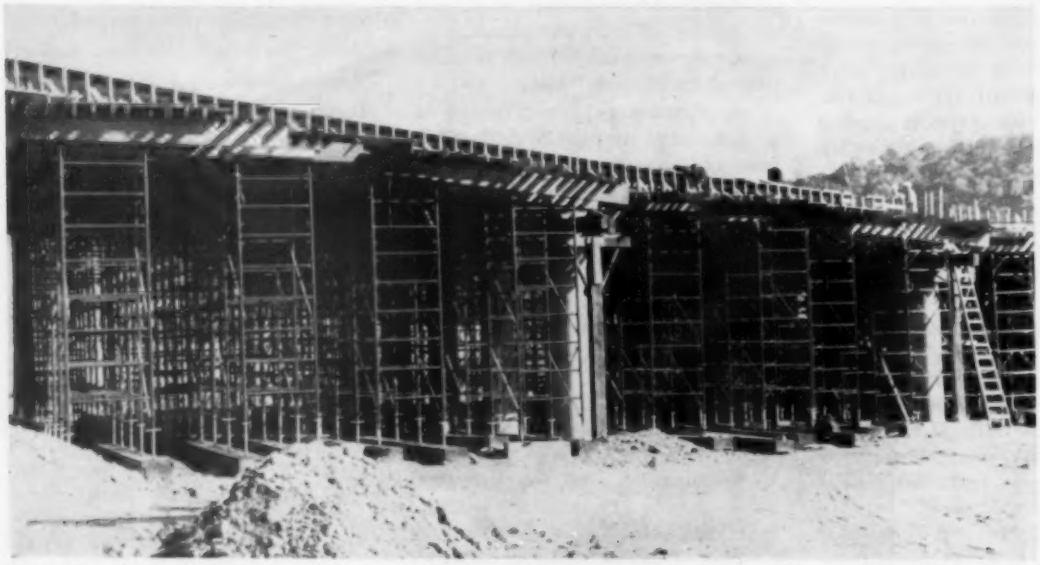
REBUILDING PARTS

Continued from page 68

with the manual method. There is less operator fatigue and additional savings are realized because there are no stub end losses.

This technique also works well on equipment with round and square tamps. Thompson & Sons' maintenance force report that this hard-facing operation has made it possible for them to continuously use sheepsfoot tampers for three to four times the period of time formerly possible before rebuilding was practiced. The shop men add that the nature of this rebuilding with abrasion resistant alloys results in a tamp having less of a tendency to wear into a point; hence the rig's efficiency of compaction remains relatively high throughout its operational life.

Tubular Shoring for Minnesota Bridge



Note how the shoring tower panels are supported on heavy planking trenched shallowly into the ground.

First use in Minnesota of steel shoring to support pours is pictured here, for a project at Red Wing. Waco Hi-Load shoring was used by Industrial Construction Company, Minneapolis, as falsework on a street overpass approaching a new span being built across the Mississippi River.

The shoring consists of standard 4-ft.-wide panels of high-carbon steel tubing, together with various types of shore heads, screws, staffs and other accessories. Each panel is designed to carry a load of 20,000 lb. On the job site, the panels, which come in 3, 4, 5 and 6-ft. heights, were joined together in "towers" or combinations through use of patented Speedlock and steel cross bracing. 120 such towers were in use.

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Truscon Tunnel Liner Plates are extra thick, extra strong. Four-flange plus four solid right-angle corners provide safe working areas practically anywhere. Erect from inside the lining. Easy to handle, readily bolted in place. No special tools or training. Fast assembly saves many man-hour dollars. Available in black steel, or with a tight coat of hot dipped galvanizing. Also asphalt coated, or galvanized and asphalt coated.

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No. 2 in a series of announcements on new HOUGH *machines*

This all-new 1¾ cu. yd. PAYLOADER

is far ahead

of any machine in its price class . . . in capacity, power, design and performance

The Frank G. Hough Co. has been engaged in a continuous program of research, development and improvement of exising models ever since it pioneered the first four-wheel-drive tractor-shovel. This program led to the new concept and design of the H-30 and H-120 PAYLOADER units which gained tremendous acceptance during the past two years and has helped to maintain PAYLOADER leadership.

The H-60 represents even further progress and development. It is a completely new machine in size and capacity with these special points of interest . . .

High Lift and Long Reach: Note the ease with which the operator deposits a full load in the hopper. Faster, more productive cycles are the result.

Safety and Convenience: All bucket and boom mechanisms are located ahead of the operator compartment for maximum protection. The steeply-sloped cowl and open design give 100% visibility. The comfortable, adjustable bucket seat and conveniently located controls make operation easy. The walk-in operator's compartment is easily accessible with safety ladder and hand rails.

Less Maintenance: Only PAYLOADER units like the new H-60 have a simplified boom mechanism with a single bucket tilt cylinder. This means you have from 4 to 10 fewer pivot and grease points and fewer parts to service and maintain. Furthermore, all pivot points on steering, boom and bucket mechanisms are fitted with "O" rings and other seals which keep grease in and dirt out to provide longer life and less maintenance. The hydraulic steering system uses two direct-acting rams with fewer pivot points.

"Keep-clean" Hydraulic System: A valuable, exclusive HOUGH feature is the closed and pressure-controlled hydraulic system to keep out air-borne dust and moisture. The new cylindrical, vessel-type reservoir has extra strength and the entire top is easily removed for thorough maintenance and easy servicing. There is a complete full-flow micronic filtering system.

"No stop" Full Power-shift Transmission: This HOUGH transmission was developed exclusively for rubber-tired tractor-shovel requirements and has been thoroughly proven on thousands of PAYLOADER units. All shifts, up or down, forward or reverse, can be made "on-the-go" with no stopping and engagement of gears needed for "range-shifts."

Sealed, 4-wheel Power Brakes: These powerful brakes are air-controlled with only touch-toe effort and are sealed against dust and dirt. Furthermore, the exclusive HOUGH axle design makes it possible to service and re-line the brakes without removing and exposing planetary hubs to dust and dirt. Another important HOUGH-pioneered feature is the "Operator's choice" dual brake pedals which permit braking with or without transmission engaged.

Positive Oil Cooling: Separate fan-cooled oil-to-air radiator assures positive cooling of both transmission and torque converter oil. Another exclusive HOUGH protective feature.

"Power-transfer" Differentials: Both axles are equipped with torque-porportioning differentials. When one wheel has better traction than the other on the same axle, it can automatically receive up to 38% more torque. This assures the best possible traction at all times.

The new H-60 model is offered with a choice of gasoline or diesel power and with buckets from 1⅛ to 3½ cubic yard capacities. (S.A.E. rated) For additional information and specifications, see your HOUGH Distributor or use the attached coupon.

THE FRANK G. HOUGH CO. 10-B-1
768 Sunnyside Ave., Libertyville, Ill.

Send full data on all-new Model H-60 "PAYLOADER"

Name _____
Title _____
Company _____
Street _____
City _____ State _____

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
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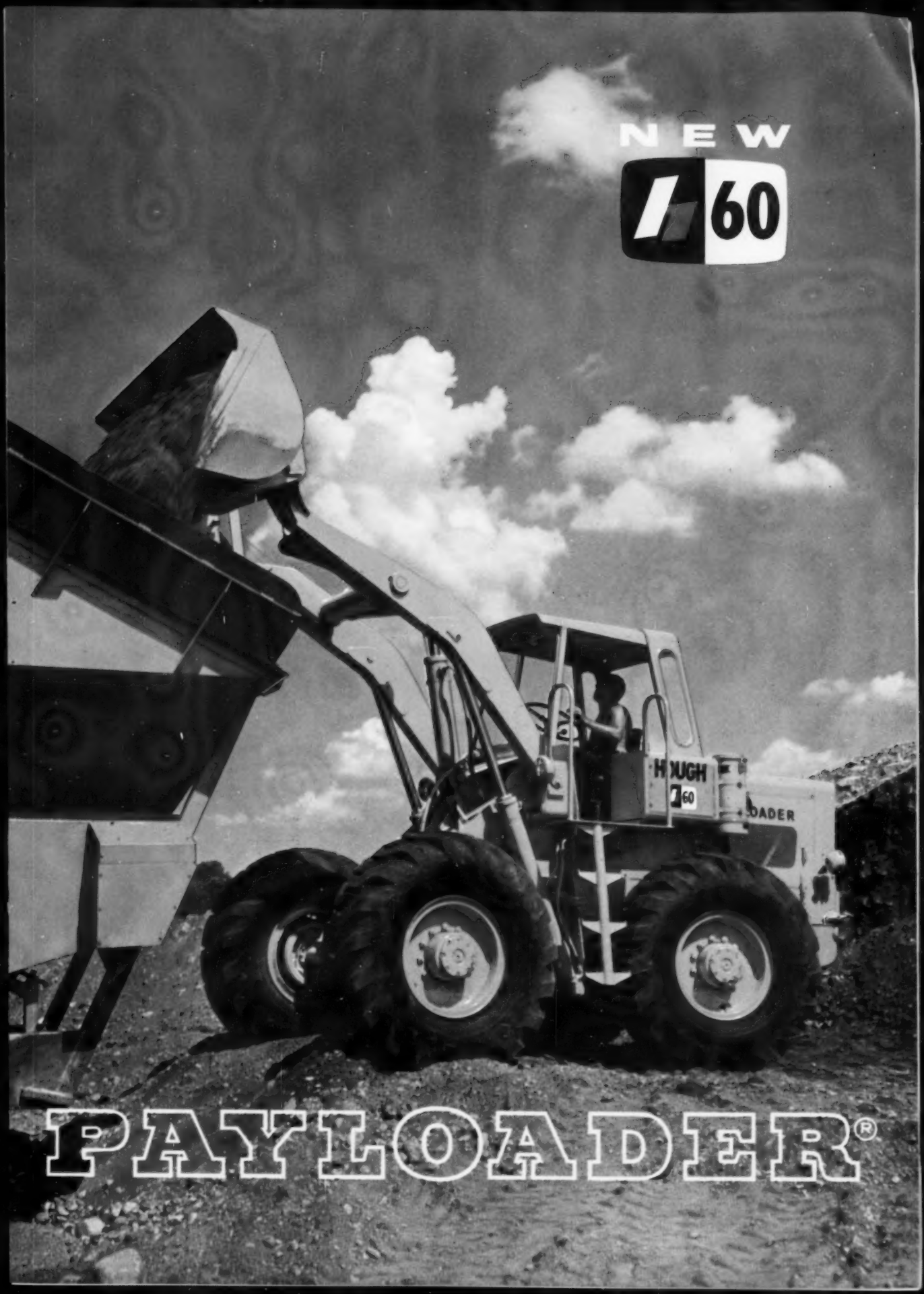
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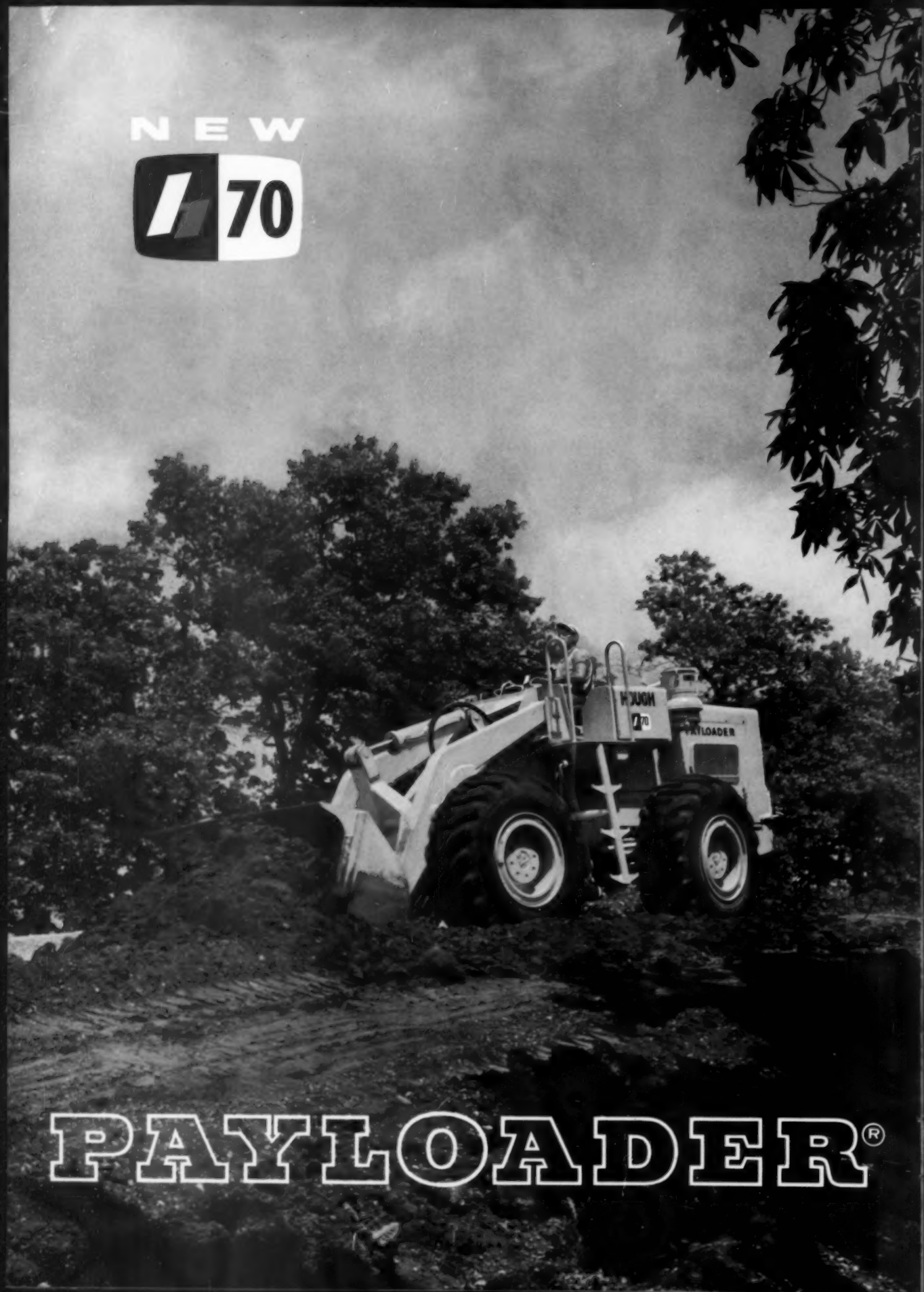
PAYLOADER®

NEW

70



PAYLOADER®

No. 3 in a series of announcements on new HOUGH *machines*

The new 2½ cu. yd. PAYLOADER

has everything

according to the aggregate producers and contractors who tested this unit

The advanced design and exclusive features of this new H-70 series "C" model were subjected to many months of continuous, rugged testing by users on actual job-site locations before final evaluation.

Those items which contributed the most to the unmatched performance of the smaller H-30 and larger H-120 four-wheel-drive PAYLOADER models during the past two years served as a guide for the development of this completely new 2½ cubic yard tractor-shovel.

By comparison with the previous model, the H-70C has increased capacity, more power, greater flotation, additional reach, easier handling, simplified maintenance, new safety features and vastly superior performance. Some of the features are:

More Capacity: An increase of 25% in the size of the standard bucket, from 2 to 2½ cubic yards. (S.A.E. rated) Optional buckets from 1⅜ to 5 cu. yds. are available.

More Power: The new heavy-duty diesel engine delivers 148 hp which is an increase of 20% over the previous model. This gives the H-70C more horsepower per pound of machine weight than any comparable machine.

Safety and Convenience: All bucket and boom mechanisms are located ahead of the operator compartment for maximum protection. The steeply-sloped cowl and open design give 100% visibility. A comfortable, adjustable bucket seat and conveniently located controls make operation easy. Safety ladder and hand rails provide easy access to the walk-in driver compartment.

Less Maintenance: The only loader in its class with simplified PAYLOADER boom mechanism and single bucket tilt cylinder. This means you have from 4 to 10 fewer pivot and grease points and fewer parts to service and maintain. In addition, all pivot points on steering, boom and bucket mechanisms are fitted with "O" rings and other seals which keep grease in and dirt out to provide longer life and less maintenance.

"Keep-clean" Hydraulic System: A valuable, exclusive HOUGH feature is the closed and pressure-controlled hydraulic system to keep out air-borne dust and moisture. The new cylindrical, vessel-type reservoir has extra strength and the entire top is easily removed for thorough maintenance and easy servicing. There is a complete full-flow micronic filtering system.

"No-stop" Full Power-shift Transmission: This HOUGH transmission was developed exclusively for rubber-tired tractor-shovel requirements and has been thoroughly proven on thousands of PAYLOADER units. All shifts, up or down, forward or reverse, can be made "on-the-go" with no stops for any "range-shift" engaging of gears.

The H-70 series "C" has many other proven HOUGH features including a separate fan-cooled, oil-to-air radiator for effective cooling of both torque-converter and transmission oil; torque-proportioning differentials for better traction; "operator's choice" dual brake pedals which permit braking with or without transmission engaged. For complete information on the tractor-shovel that "has everything" see your HOUGH distributor or use the coupon.

THE FRANK G. HOUGH CO.
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Send complete data on H-70C PAYLOADER

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Shop-built rail washer is part of the California highway division's program of reducing inefficient and costly hand labor while keeping abreast of rising upkeep requirements on the state's expanding freeway mileage.

Cost-Saving Guard Rail Scrubber

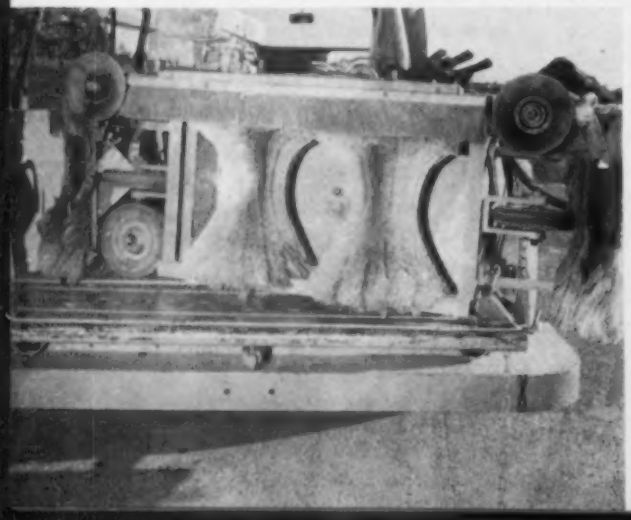
Guard rail washing, long a tedious and expensive highway maintenance chore, has been reduced to an easy mechanical routine by maintenance forces of the California Division of Highways in southern California.

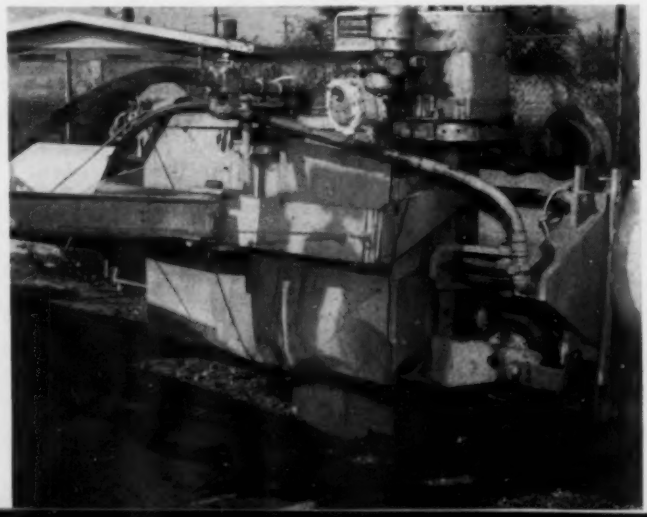
Working with a local fabrication firm, district 7 personnel came up with a truck-mounted, self-powered scrubbing machine that cleans the Tuthill-type steel rails at the rate of 150 ft. per minute. This is many times faster than conventional hand scrubbing, and the job is done far better.

Built to meet the specific needs of guard rail scrubbing, the unit has two rotating contoured brushes powered by a Briggs & Stratton 3-hp air cooled engine. Detergent carried in a 300-gal. tank towed behind the truck is sprayed on the rail through nozzles mounted in front of and between the rotating brushes.

The whole rig is carried on the front bumper of an F-600 Ford two-ton dump truck. Pneumatic rams with 18-in. lateral and 12-in. vertical movement permit the truck driver to keep the washer correctly

At left: hood raised to show pair of contoured spinning brushes and wheels used for centering and support of the washer as it moves. Right: hood down, ready to operate. Hose lines carry detergent to spray heads.





positioned on the rail as the rig moves along the uneven shoulder.

According to figures gathered by district 7 personnel, the total cost per rail-foot of washing with the mechanical washer is $0.004. Conventional washing costs $0.06 per rail-foot.

Even more dramatic is the increased production. The best footage averaged with normal hand washing was 2,632 ft. per day. The new washer averages 5,130 lin. ft. *per hour!*

Most of the manufacturing and assembling was done by the Industrial Brush Co., a southern California firm. Hood and bracket attachments allow the assembly to be used as a guard rail painter as well. Successful use for this purpose, however, must await further perfection of a spray technique which keeps mist to a minimum.

California highway maintenance people hope to consolidate this guard-rail scrubbing outfit onto one chassis. Tank trailer carries 300 gal. of detergent and truck bed has additional engines for compressors.

Seeded Blankets For Starting Grass

Laying the seeded blanket in a median strip.

Median strip seen one month after blanket was laid. Some sand has washed in, but grass has grown to 4 to 6 in. height.

Seeded blankets which can be easily rolled out and tamped down have been developed by Troy Blanket Mills to provide a grass covering in areas where other planting methods present difficulties.

Known as Troyturf, the seeded blankets consist of 20-ounce mat of jute, a bottom layer of special paper, seed, fertilizer, Ph control, Vermiculite, and organic mulch which provides a uniform distribution of 2½ tons per acre.

The blankets will grow grass without special soil preparation. They are particularly suitable for areas where soil erosion or gullying is a problem, according to the manufacturer. They are also said to be practical in many areas where sodding is too costly. Any combination of seed, fertilizer, and moisture control agent can be used for a specific location.

In placing, the end of the seeded blanket is either placed under soil or staked at the ends. The blanket is rolled out from the buried end and cut to the desired length. This cut end is held by again burying or staking. Blankets are laid side by side and can be butted or lapped. Watering makes the material adhere to the subsoil. No regular seeding of the ground, or overseeding of the mat is necessary.

The needled body of the blanket holds seeds while they germinate.

Brewster's rock work east of big hill along Route 4 (seen at left). A Bucyrus-Erie (120-B) 5-yd. electric shovel is loading Euclids. The trench is for a sewer at the base of 50-ft. sidehill rock cut.

BREWSTER BELTS ROCK

Continued from page 52

The entire system is operated from a master control panel located at the truck bins. Interlocked controls provide sequence starting and stopping of the system, or emergency stopping in event of malfunction.

3. Power facilities for Brewster's area work constitute another job feature. The tremendous amount of power needed for the conveyors is obtained from a substation located along the way. Power is relayed to five completely-equipped, self-contained, trailer-mounted substations which contain switching gear and transformers. These reduce the 2,300-volt line current to 440 volts for operating the motors.

4. Big electric shovels are a logical part of this menage, and Brewster is using two of the firm's familiar Bucyrus-Erie 120-B 5-yd. electric shovels. These take juice from one of the substations, via cable strung in temporary ducts or over skid-mounted poles to the work sites. The two shovels will be the principal actors in the big cut feeding the belts, and have worked during the 1961 summer on heavy rock work nearer the George Washington Bridge.

Continued on page 86

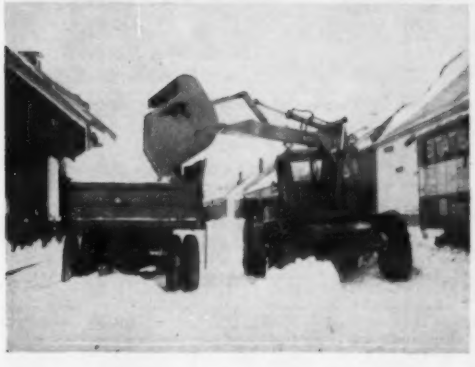
Housed here is Brewster's unique (for highway work) compressor installation—8,000 cfm capacity installed in a steel building. Four new Ingersoll-Rand XLE-2 units supply the job via pipeline.

NO SEASONAL LAYOFFS ALL SEASON PAYOFFS!

PETTIBONE

180° SPEED SWING

ALL-PURPOSE MATERIAL HANDLER



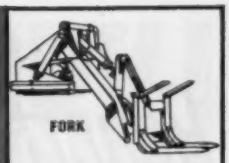
YOU PROFIT with a Pettibone Speed Swing because you never have to lay it off due to seasonal changes or job operation difficulties.

Its amazing *versatility* and *all-around applicability* puts it *on call 365 days a year!* It's always ready and able to handle every call covering a host of different kinds of jobs. In fact, the necessary downtime of a Speed Swing is held to an absolute minimum . . . just long enough for you to make a fast switch to any one of the 10 *quickly-interchangeable* attachments. Then it's off to tackle the next job on your schedule. And this goes on the year around!

With the *exclusive* Pettibone 180° swinging boom, it handles a score of different materials *faster* and safer because it *swings the load* instead of *the loader.* There's no gee-hawing, no costly, time-consuming maneuvering all over the lot! The Speed Swing works up close to the job with maximum safety, right alongside or in back of trucks . . . out of the way of moving traffic, out of the way of other equipment, out of the way of other workmen—OUT-PERFORMING other material-handling equipment day-in, day-out . . . on job sites of every description!

And, when winter comes, the Speed Swing will remove snow in record time without obstructing traffic. Or load out sand, cinders, or salt products for ice control. The above are just a *few* of the many reasons why the owner of a Speed Swing has *no seasonal layoffs* . . . just ALL-SEASON PAYOFFS!

Learn *all* the reasons why the Pettibone 180° Speed Swing is the *most versatile, most productive* all-purpose material handler for you. Write today!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18' BOOM EXTENSION

WIRE & PIPE HOOK

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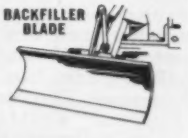
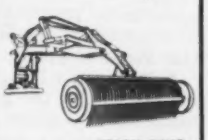
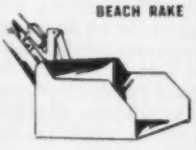

BACKFILLER BLADE


BEACH RAKE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Report from Booming New York State...

NASSAU COUNTY GOES GAR WOOD EXCLUSIVELY FOR 26 YEARS

The Nassau, Long Island, Department of Public Works owns 65 Gar Wood truck bodies and hoists, and since 1935 has used Gar Wood truck equipment exclusively.

The reason is expressed by Herbert Abrams, General Foreman of the Road Maintenance Division. Says Abrams: "I've learned from experience that Gar Wood truck equipment is built to last; to perform at its best without expensive maintenance. I'll take a Gar Wood hoist and body anytime."

Abrams' equipment gets a year-'round workout spreading stone, sand and salt, laying cinders, and performing general hauling tasks.

Buckeye 407 Digs Service Lines in Long Island

Lynbrook, Long Island, contractor S. T. Grand, Inc. owns five GarWood-Buckeye ditchers, three of which are Buckeye 407's.

States Foreman Joe Poole: "The Buckeye 407 digs more than 1000 feet a day for us through all kinds of terrain. It works hard and fast, and requires little maintenance. For working in and out of tight places, and over an irregular digging line, you can't beat a 407."

Control of the 407 is so easy and accurate that Grand's operator runs the machine virtually with his fingertips, standing at its side (see photo).

New York Contractor Earns 45% More with Gar Wood Hopper Trailer

Taking advantage of Gar Wood's Free Payload Analysis program, a New York contractor recently compared the performance of his tandem rear dump trucks with the Gar Wood "Easterner" hopper trailer. The test involved hauling gravel for road construction, and was conducted under severe weather conditions.

The results (see chart) speak for themselves. This contractor found the "Easterner" would earn enough extra revenue to practically pay for itself in a single year! He now owns five Gar Wood hoppers.

Gar Wood's hopper line includes models to give the greatest legal payloads in any given state, eliminate profit-slashing overload fines, and operate at top capacity under all regional conditions.

Gar Wood will make a Free Payload Analysis of your operation, just like the one illustrated, to show you how hopper trailers can produce extra revenue. See your local Gar Wood distributor, or phone Trailer Sales Department.

GAR WOOD "EASTERNER" hopper trailer gives you powerful tandem-drive traction plus far greater legal payloads. This unique combination produces extra hauling revenue for both on- and off-highway work.

	HOPPER TRAILER	REAR DUMP TRUCK
Legal Yards Per Trip	15	10½
Miles Per Trip (One-way, Loaded)	7	7
Yard Miles Per Trip	105	73.5
Hauling Revenue Per Yard Mile	12.4¢	12.4¢
Revenue Per Trip – Per Unit	$13.20	$9.11
Trips Per Day	12	12
Revenue Per Day	$158.40	$109.32
EXTRA Revenue Per Day	$ 49.08	
Working Days Per Year	120	
EXTRA REVENUE PER YEAR PER UNIT	**$5889.60**	

GAR WOOD'S AT WORK!

Dozer Blades, Pump, Ripper on Job at 100-Million-Dollar Missile Site

GAR WOOD VARIACS PUMP, controlling the Gar Wood dozer blade on this Euclid C-6, allows operator to meter tractor horsepower to requirements of both blade and crawlers, saving both horsepower and fuel, eliminating heat build-up.

At the new Plattsburgh Missile Site, Gar Wood equipment matched to four Euclid C-6 tractors is being used to lay a 205-mile inter-site communication cable. The job is being done by the Gustav Hirsch Organization, Inc. of Columbus, Ohio, a world-wide electrical contractor and consulting engineering firm.

The job is a tough one, running through terrain varying from the Adirondack Mountains to swampland. The contractor reports complete satisfaction with the performance of his Gar Wood equipment.

Included in this Gar Wood equipment are Tipdozer blades, cable control units, a hydraulic ripper, and the revolutionary Variacs variable volume piston pump. Variacs represents a new concept in hydraulics—a pump that delivers oil only on demand, only in the volume required—and its performance at Plattsburgh has been outstanding.

The Gar Wood ripper is used to dig the four-foot-deep trench into which the cable is laid. The other three units are used for clearing and filling.

The successful operation at Plattsburgh is but one example of why contractors in New York and across the country pick the Euclid-Gar Wood combination. For more than 35 years Gar Wood has been the leader in the design, development and manufacture of equipment matched to the world's most powerful tractors—equipment combining precision control with the ruggedness to meet the toughest operating conditions.

CABLE TRENCH FOUR FEET DEEP CUT BY HYDRAULIC RIPPER

More than a million feet of ditch is being cut by this Gar Wood hydraulic ripper at Plattsburgh.

The ripper is drawbar mounted to the Euclid C-6 tractor frame, eliminating any pull on the transmission case. The cast alloy steel tooth is triple-wedged for positive retention, yet is easily changed. The powerful hydraulic unit with its straight-down thrust rams locks to maintain unvarying ripping depth, and keeps the ripper cutting through the rockiest terrain.

GAR WOOD INDUSTRIES, INC.

Wayne, Mich. • Findlay, Ohio

Another of Geo. M. Brewster's on-site plants, set up to crush rock out of the cuts. (This plant not related to the conveyor.) The primary jaw is being fed by Koehring Dumptors.

Atals-Copco bit grinder on the Geo. M. Brewster job.

BREWSTER BELTS ROCK

Continued from page 82

5. A big-capacity central compressed air station is yet another part of Brewster's strategy for rock handling. Four of Ingersoll-Rand's new XLE-2 skid-mounted compressors are installed in a 40′ x 60′ steel building, which the company reassembled from a previous work site. These specially packaged units supply air at 125 psi, and 1,888 cfm per machine. Each is powered by a 350 hp engine, and each has a water-cooled radiator, synchronous motor and exciter, fully automatic Westinghouse starting panel, complete water system, with Ingersoll-Rand Motorpump, PL after-cooler and receiver.

The station was set up with a view of replacing at least ten or twelve portable compressors for drilling rock in the big cut and elsewhere. The air supply will also power all kinds of tools throughout the area jobs. To serve various work sites, some two miles of 8-in. steel pipe is strung from the station along the I-95 right-of-way, with junctions for smaller aluminum branch pipe and hose lines.

The stationary compressors went into action late in the summer, taking over much of the work load previously handled by batteries of Ingersoll-Rand and Gardner-Denver 600 and 900 portable compressor units. The setup frees a number of Brewster drill

Brewster's very large rock yardage has been handled with track-mounted drills. Supplementing the stationary compressor station, these two Ingersoll-Rand 600's and a Gardner-Denver 900 compressor (in rear) powered the three drills pictured, with sometimes a fourth drill hooked in—under a policy of keeping excess air on all drills for maximum production.

At the delivery end of the two-mile-long conveyor, this truck loading station sends rock to the marsh fill area via Koehring Dumptors and other rear-dumps.

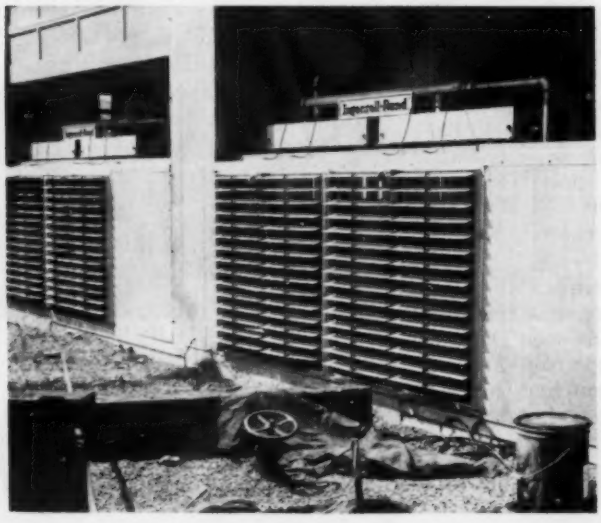
Where one belt section ends and other starts. Note protective bridge span which takes the rock flow over a local street.

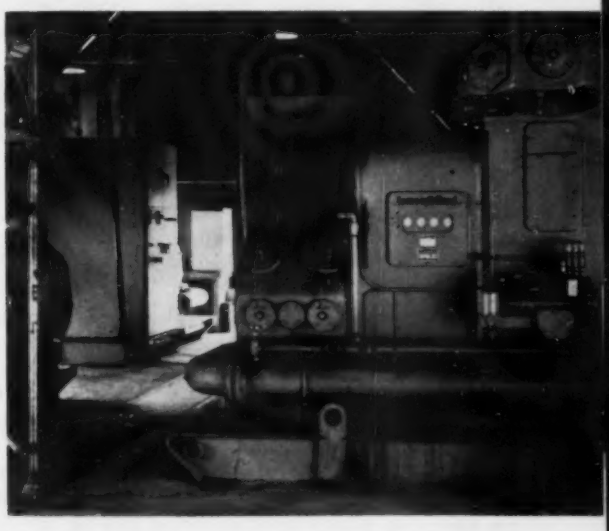
operators for other work, and will save labor and time of shifting portable compressors around.

6. One other special setup related to Brewster's rock work, is that for crushing rock in the Port of New York Authority group of jobs near the big bridge. A Kennedy Van Sain 4680 jaw crusher with conveyor to truck-loading bins was erected in the job area, at short haul distance from shovels. Rock brought by Koehring Dumptors is broken down to 6 in. size and much of the output is trucked several miles to Brewster's headquarters at Bogota, N. J. There it is given a secondary reduction and brought back as needed for use as structure backfill, subbase or other aggregate in the various Port of New York Authority jobs. This setup solved problems of space limitation (and noise and dust) as an alternate to full-reduction crushing and screening at the urban job site.

7. Brewster's equipment fleet for the group of contracts, not counting sand drain projects to the west, is an impressive one. A recent count of major units, before the conveyor and compressor house began operating, tallied: two Bucyrus-Erie 120-B 5-yd. shovels included a Bucyrus-Erie 54-B 2½-yd. and a Lorain 2-yd. shovel; nine truck cranes (Bucyrus-Erie 30-Bs, 30-ton Lorains, Model 555 P&Hs and a Manitowoc 3500 dragline); a Northwest 80D and two Lorain back-

Details of the compressor house installation: radiators of two units set in the wall on each side; skid-mounting visible for one of the XLE-2 compressors.





One of the conveyor units, designed for maximum re-use and salvage value at the end of this job.

hoes; nine Caterpillar D8s and three D9 tractors; a Traxcavator 977 loader; a Buffalo-Springfield Kompactor and various sheepsfoot rollers; two Cat 12 motor graders; two of Brewster's famed Jumbo (5,000-gal.) sprinklers); 15 Euclid 24S rear-dumps; several Cook 24-yd. trailer bottom-dumps; several Koehring Dumptors; varying numbers of Ingersoll-Rand and Gardner-Denver 600 and 900 compressors; Ingersoll-Rand, Chicago-Pneumatics and Joy crawler-mounted drills for 4½ in. bit size; numerous heavy dump trucks (Macks and other); and ten service rigs.

Bits for drilling the hard traprock are Atlas Copco Coromant tungsten-carbide tipped, with Atlas Copco sharpening stations on the job.

Blasting has been done with semi-gelatin, straight gelatin and prepared ammonium nitrate. Hole depth for shooting has varied from a few feet to an extreme of 80 ft., with large-ledge conditions prevailing at several locations. In this urban area relatively small daytime shots have been possible. Thanks to skillful use of millisecond delay caps, 90 percent of the blasting has been done without mats.

Earl Hoy is project manager, Don Totten general superintendent, and Harold Dietler project engineer for the group of contracts here discussed, and Palmer Kaufman project engineer on the Port Authority projects of Geo. M. Brewster & Son's Co. Inc.

The projects in this area are under the New Jersey state highway department's Newark district office. A. E. Schenk, district engineer, with Henry Myer and Paul Shiddowski resident engineers on the Brewster work.

New Chemical Aids Soil Compaction

A new method of chemically conditioning soil as an aid to compaction is available under the name, Chempact. This chemical, technically speaking, oxidizes organic matter, removing flocculating ions and pepitizing colloidal particles. The manufacturer, Central-Reynolds Company, reports that this compound is not mean to add anything to the soil. Rather, it takes out a measurable amount of clements that make soil difficult or impossible to control.

The principal problem confronting highway engineers in dealing with soils is the decayed or decaying organics and salts in the earth. These materials coat the individual particles and often fill the pore spaces. If the soil is wet, these organics and salts act as lubricants. If a steady or sustained force is applied, the material becomes oozy. These two components, inorganics and salts, play a role in nearly all compacting problems.

Chempact is added usually in the form of 1 gal. to 1,000 gal. of water for treating 5,000 to 10,000 sq. ft. of soil area. A coverage of 6,000 sq. ft. is a recommended average for initial treatment. Thereafter, the rate can be changed as found necessary. Heavy clays, soils with high organic content and desert soils with high concentrations of salts require about 5,000 sq. ft. coverage level. Loose uncemented sand is usually controlled near the 10,000 sq. ft. application mark. The willingness of soil to accept the water is a good clue. Covering 6,000 sq. ft., the rate of penetration will usually be between 6 and 12 in. on new fills.

The use of Chempact is said to reduce maintenance costs and help keep low type roads open all year. Pot holes and washboard effect on roads can be eliminated, by this treatment, it is claimed, due to the absence of organics and salts that originally contributed to this type of deterioration.

Road Builder Sets Up Unique Scholarship

The large road building firm, Cone Brothers Contracting Company, of Tampa, Florida, has established an annual $4,000 scholarship with unique provisions. The successful candidate each year will have his choice of attending either the University of Florida or Georgia Institute of Technology. He will be encouraged to follow a cooperative training program where his academic work will blend with actual on-the-job experience.

Said J. L. Cone, Jr., president: "We must have well trained engineers leading America's continued industrial growth. It is up to concerns such as ours to make sure these young people have the opportunity of exploiting their natural abilities." Attitude will play an important part in the scholarship award. Sons of employes are given first preference in the competition.

What size grader do you need?

There's an LW that fits your requirements

Once your grader needs are more or less established, you have an opportunity to specialize on a grader of a particular size. It's possible, in a multi-model line, to get the exact size that's just *big* enough to handle your work . . . just *small* enough to afford good savings in operating costs. Then you're sure of lowest investment for your work assignments.

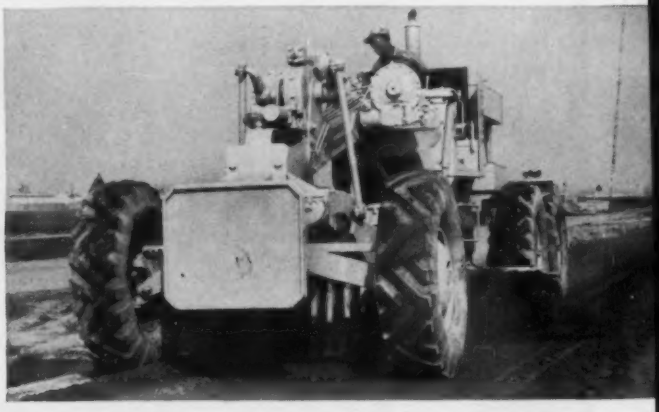
LeTourneau-Westinghouse graders are available in 7 sizes, with horsepower ratings from 85 to 190, weights from 10¾ to 14 tons. All sizes have constant-mesh transmission; 145 and 190-hp POWER-*Flow*® models have torque converter. A variety of matched attachments increase the work range in each size. Major items are: scarifier, bulldozer blade, push-plate, Ateco rear-mounted ripper, snow removal equipment, Jebco Elegrader and Preco Dial-A-Slope blade control.

Let your LW Distributor help determine what size of graders will do *your* work most efficiently, cut operating costs, and give you highest return on your grader-investment dollar.

85-hp 330 . . . this economy-priced model has many LW "big-grader" features. Another low-budget LW grader is the 100-hp 330-H.

115-hp 440 . . . biggest-value motor grader in this popular size. 8-ft long, 35-in. high dozer-blade is hydraulically controlled from the cab.

125-hp 550 . . . heavy-duty all-purpose machine. Choice of GM or Cummins diesel engine, as on all LW graders.



145-hp 550 POWER-*Flow* . . . torque converter, infinite speed ranges to 26.4 mph. "550" shown is equipped with Dial-A-Slope blade control. Push-plate and V-type scarifier give it extra job versatility. 660 POWER-*Flow* has 190 hp . . . speeds to 26 mph. G-2395-G-1

160-hp 660 . . . biggest, heaviest grader in the "straight-shift" Le Tourneau-Westinghouse line.

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company Where quality is a habit

. . . for more details circle 316 on enclosed return postal card

LW D 'PULL* WITH 10-YD ELEVATING SCRAPER

has a place on

You can use it on any and all of these applications...

1. General cut-and-fill
2. Clean-up earthwork
3. Spread base materials between forms
4. Repair roads, shape shoulders, clean ditches
5. Subdivision streets, site preparation, backfill to foundations
6. Finish for landscaping, stockpile topsoil
7. Grade streets, alleys, renewal projects
8. Sanitary landfill garbage disposal
9. Grade parks, beaches, school grounds
10. Build small dams, stock ponds, tanks
11. Level, terrace irrigated land
12. Remove mine, pit overburden
13. Load and haul sand, gravel, peat, coal, sawdust, wastes
14. Blend and load mixtures of materials
15. Remove snow

Materials it will load

1. Topsoil
2. Loam
3. Sand and loose gravel
4. Clays, except highly plastic clays when super-saturated or baked brick-hard
5. Clay mixtures and other soft materials
6. Rocks to 12" that occasionally occur with dirt; rocks to 28", individually loaded

Materials not recommended

1. Slab rock
2. Shale, unless well broken
3. Solid-packed gravel in hard clay, unless broken
4. Rip-rap and rock-type materials

...THESE OWNERS† DO.....

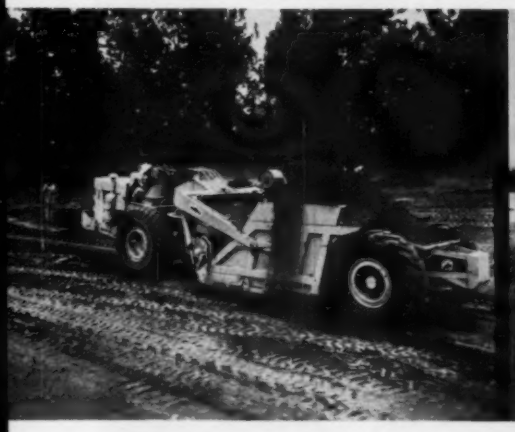
MINNESOTA — Contractor time-studied his LeTourneau-Westinghouse "D" with Hancock scraper on street rebuilding, found *this one self-loading machine replaced front-end loader, three trucks, four operators — outproduced them by over 90 yds per day!*

MISSOURI — "Since we never have to use a pusher with our 'D' and Hancock," reports owner, "we assign our push-tractor to dozing where it's making *money for us. This LW machine has also increased our operating efficiency over 30 percent!*"

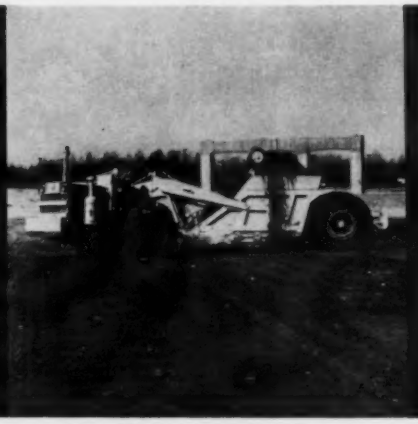
We will be happy to give you complete details on the 143-hp D Tournapull with 10-yd Hancock elevating scraper. Available with step-gear or torque-converter transmission, speeds to 30 mph. You can also interchange elevating scraper for a conventional 9-yd LW scraper or 11-ton LW Rear-Dump. Ask for a demonstration.

every dirtmoving job

..... AND LOOK AT THE RESULTS:



TEXAS — Grading streets for subdivision, this D 'Pull with elevating scraper picked up heaped loads of dirt and clay in an average of 30 seconds. Owner of the LW machine is well satisfied with performance, *likes its money-saving permit-free roadability.*



MICHIGAN — *"Really loads up fast, extremely versatile and useful,"* says this road contractor. His 143-hp D Tournapull® cuts drainage ditches, hauls gravel, handles finishing and clean-up. Frees his big scrapers and pushers for production work.

NEBRASKA — Conservation contractor teams up 3 "D"-Hancocks on large projects like this irrigation feeder canal. And, on small land-leveling and water control projects, these one-man, self-loading machines work alone on separate, scattered jobs.

CALIFORNIA — This contractor supplements "big" earthmovers with self-loading "D" for lower costs on odd-lot and clean-up work. Here, on a large freeway project, D 'Pull-Hancock loads-out windrowed dirt and shoulder base materials, filled low areas.

FLORIDA — Leveling 500 acres for use as a citrus grove, "D"-Hancock loaded and hauled sand, marl and clay. Self-loading unit allowed expansion of contractor's dirtmoving capacity by one scraper, *without requiring the addition of another push-tractor!*

WISCONSIN — "We save $19,500 a year in push-tractor costs because this machine works *alone,*" comments owner of gravel-pit and contracting firm. At pit, "D" strips overburden and hauls gravel to stockpile — also travels highways to earthmoving jobs.

† Names and addresses will be supplied on request.

*Trademark DPH-2480-DCJ-2

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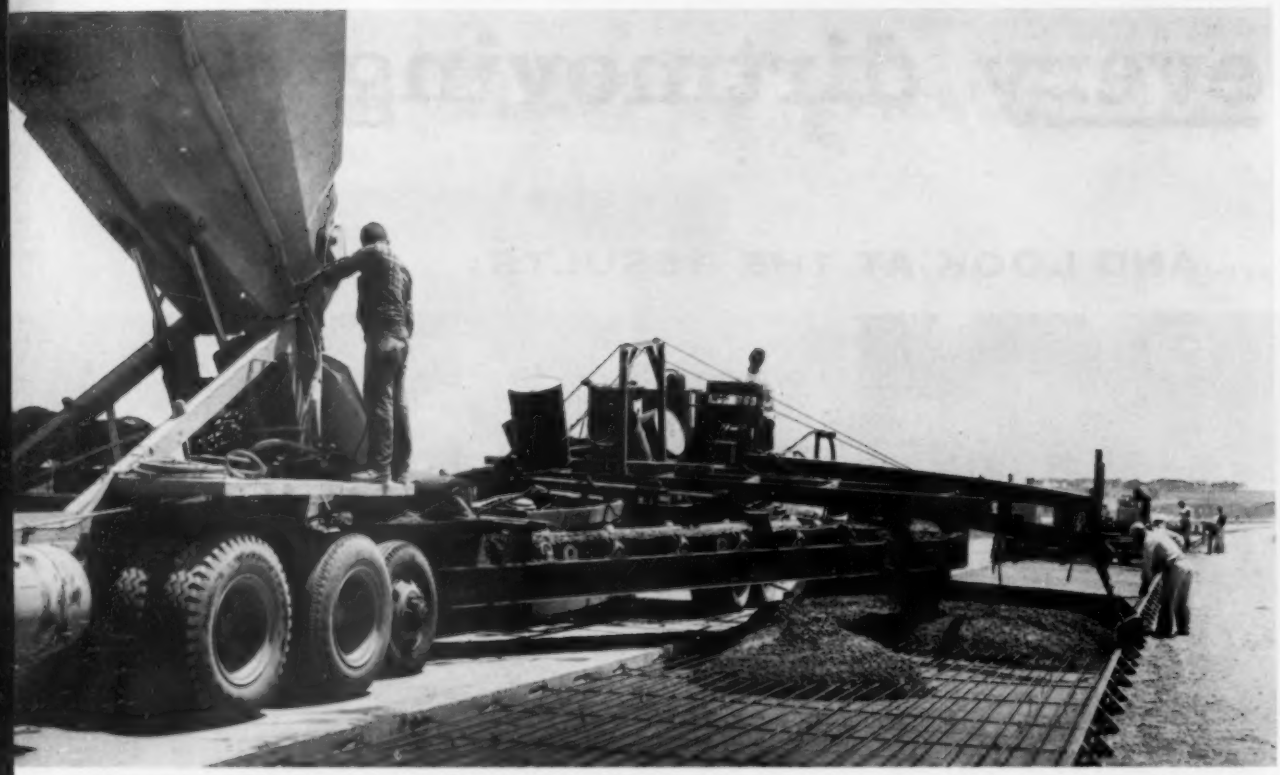


The unique Mengel conveyor-spreader. Central mixed concrete is being dumped onto a conveyor belt which fans out laterally across the grade to drop the mix where desired.

PLACING CONTINUOUS REINFORCEMENT

Continued from page 49

the stock carried on the auxiliary trailer. This man also had the job of fastening the "chairs" to the reinforcement as it played over the roller on the small trailer. There was a 50-gal. fiber drum containing these devices on each side of the trailer; the worker picked up three chairs and walked beneath the latticework of reinforcement, clipping the little stands to longitudinal bars as he went. At the other side he took three more from that drum and, after the truck had pulled ahead a few feet, repeated the performance in the opposite direction.

These chairs supported the longitudinal bars of the reinforcement at a height of 4 in.

The men doing the splicing on the main trailer were outfitted with special gear for their job. Each wore a leather belt with a 5-in. diameter reel holding the wire. They used a pair of pliers with a little cutting notch; the tie was made with a few deft twists and then cut. Also, since each man had to stand between and astride the bars as they were pulled from the truck, he wore a pair of leather "chaps" to absorb the rub and the wear.

The foreman of the steel crew, standing on a platform at the side of the trailer, moved the trailer ahead at the appropriate moment. He watched the progress of those splicing the ends of the longitudinal bars and upon observing that the last tie was within one or two twists from completion sounded two blasts on an air horn. The driver pulled ahead 8 ft. and that amount of spliced reinforcement was pulled out of the truck and onto the base.

To maintain a steady forward movement, the foreman, as noted, keyed the pace of the steel crew to the tying of the longitudinal bars. Thus with every two or three movements of the truck and trailer, there was one man who was not able to complete his splice on a transverse bar. These "missing" ties were completed when the progress of the steel trailer was halted to pick up a new stock of bars; the foreman, with three or four workers, walked back over the course of reinforcement laid since the last supply pick-up, examined the mesh and made the missing splices.

Keeping Material Arrivals on Schedule

The logistics of supply of the reinforcement material was another factor of the job requiring careful attention. The contractor received, each working day, an average of two trailer loads of rod from the supplier, Calumet Steel Co., in Chicago. An average load of 1,160 40-ft. longitudinal bars weighing over 48,000 lb. was trucked directly to the right-of-way where it was unloaded at 1,800-ft. intervals.

Three members of the steel crew readied the supplies of bars for transferral to the trailer bed. The bundles were moved by crane to the slab or grade adjacent to the lane being paved. There the men cut open the straps on the individual bundles so that when laid on the trailer each bar would be ready for im-

Continued on page 94

Texas Interstate 35E, Stemmons Freeway out of Dallas.

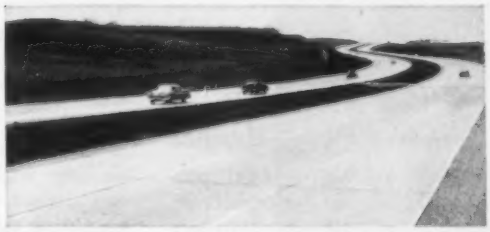
Texas' 352 miles of Interstate awarded to CONCRETE promise big savings in upkeep!

Across Texas, modern concrete highways grow in length—a public reminder of the skills and dedication of the engineers and builders who are creating them.

A solid future is built right into roads like these. Only concrete enables engineers to design pavements to last 50 years and more.

Concrete isn't flexible, so there are no "moving parts" in it to cause hidden wear. And even with the highest temperatures, it won't soften and ripple under traffic. Concrete actually grows stronger year by year.

All these advantages mean extra thrift for Texas as it builds with concrete: Exceptional pavement life . . . upkeep costs that run far less than for asphalt. It's for reasons like these that most Interstate mileage across the nation today is going to concrete.



Texas Interstate 20, Dallas—Ft. Worth Turnpike.

38% maintenance saving with concrete, Texas' 31-year records show!

Official Texas State Highway Department records give the facts: Since 1929, road maintenance costs per mile per year for concrete have averaged $144.68; for asphalt, $235.23. Texas' new concrete highways will do even better!

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

PLACING CONTINUOUS REINFORCEMENT

Continued from page 92

mediate forwarding to the splicers.

As the steel train reached a parallel spot on the roadway the bundles, with slings still attached, were rehandled to the trailer.

Mengel's paving outfit featured a spreader which, though largely experimental until two years ago, is now "the heart of our operation," according to Bill Mengel. The self-propelled, rubber-tired unit, designed specifically to distribute central mix or transit mix concrete between the forms, was built from an old tandem axle truck frame. From the operator's seat at the rear, a boom extends ahead some 25 ft. at which point the truck backs into and engages a hook. With its axis here, a 36-in. wide belt conveyor rotates latitudinally out over the roadbed spreading the mix evenly between the forms. A screed strikes off the material at the designated height.

Seven trucks with Agitor bodies transported the mix to the site. At the time when the conveyor-spreader was first being put to use on state paving work in 1959, the Mengel firm was using a fleet of transit-mix trucks. Bill Mengel was asked about the change to another type of haul unit. His answer: "We have found that, with this special type of unit (Agitor), each unit spends less time at the paving site, and we can get in more cycles per day. It used to take us 2½ to 3 minutes to empty a ready-mix drum onto our conveyor belt; with these agitated dump bodies we can empty a similar 7-yd. load in 50 seconds."

The contractor's fully automatic Rex plant was located in a natural gravel area from which was excavated abundant supplies of the needed 1½ to ¾ in. and ¾ in. to No. 4 stone. Another Mengel trademark were the depressed-level aggregate bins with gravel ramps built up to them for fast charging by front-end loaders.

Production by the plant's 6.8-yd. capacity mixer reached as high as 2,330 yd. on an 11-hour day.

Contractor Discusses Placing Problems

In the customary paving procedure, reinforcement —that is, the placing of mesh—is just one item in the paving train. But with the placement of steel for continuously reinforced concrete, the tail begins to wag the dog, according to Bill Mengel, and several new factors are created.

(1) There are now *three* important units in the paving process: the laying of forms, the paving train—and the steel crew.

(2) There is considerable increase in personnel. With the Mengel system of splicing and placement, up to 20 men were used at one time on the steel crew.

(3) The use of continuous reinforcement definitely affects the cost structure of the job, and this must be seriously considered in the bid. Cost of the reinforced steel on this Mengel job was about $2.00 per sq. yd., as compared to an average of 60 cents for mesh, Mengel said. However the slab thickness was reduced from 9 to 8 in., with the contractor thus getting about 50 cents less for the paving. The total cost for this job thus was boosted roughly by about 90 cents or $1.00 per sq. yd.

(4) Operation of the paving train must be geared to the progress of the steel crew. Mengel, for example, had to employ precisely the proper number of concrete trucks so as to keep an effective distance between the two units.

The use of continuous reinforcement eases the paving operation—just a single concrete lift is required—but the placing of the reinforcement assumes proportionately greater importance. On this Mengel job, the Wisconsin highway engineers felt that the ultimate experience with this section of roadway will show it to be less expensive. They hope it will provide, after some years' use, not only lower maintenance costs but also continue to be smoother riding than pavement placed with ordinary reinforcement.

This Mengel contract on Interstate 94 was one of two with continuously reinforced pavement to be let by the state of Wisconsin in 1961. The other contractor had planned to lay down pre-assembled mats across two lanes. Bill Mengel noted that it will be interesting to compare the speeds attained by the two methods.

See Pages 102 Through 117 For Bituminous Features

ASTM Committee C-9 on Concrete Plans Manual

A report on a new manual, proposed new projects, and reports on the work of several subcommittees were among the material presented at the meeting of Committee C-9 on Concrete and Concrete Aggregates during the 64th Annual Meeting of the American Society for Testing Materials, June 25-30, 1961, in Atlantic City, N. J.

Some new projects under way include: Collection of data from various sources to establish the experience with vibrated test specimens; round-robin tests on liquid membrane-forming compounds; a test program to refine the test methods dealing with hardened concrete; completion of a test program for obtaining data on abrasion testing apparatus on concrete floors; and collection of information on the evaluation of aggregates by freezing and thawing in concrete.

The Subcommittee on Admixtures reported a full program of research leading to the development of specifications for chemical-type admixtures. Proposed specifications should be available during the coming year. A very extensive program of collecting data on fly ash has been completed but not yet analyzed.

The Subcommittee on Organic Materials for Bonding, Patching, and Sealing Concrete plans to develop performance requirements for all types of materials, particularly the epoxy resins.

A proposed method of test for compressive strength of insulating concretes was agreed upon. Revisions in existing specifications for lightweight aggregates (C 330, C 331, and C 332), were accepted in the subcommittee for later action by Committee C-9.

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402	403	404	405	406	407	408	409	410	411	412	413						

Name _____ Title _____

Firm or Gov't. Dept. _____

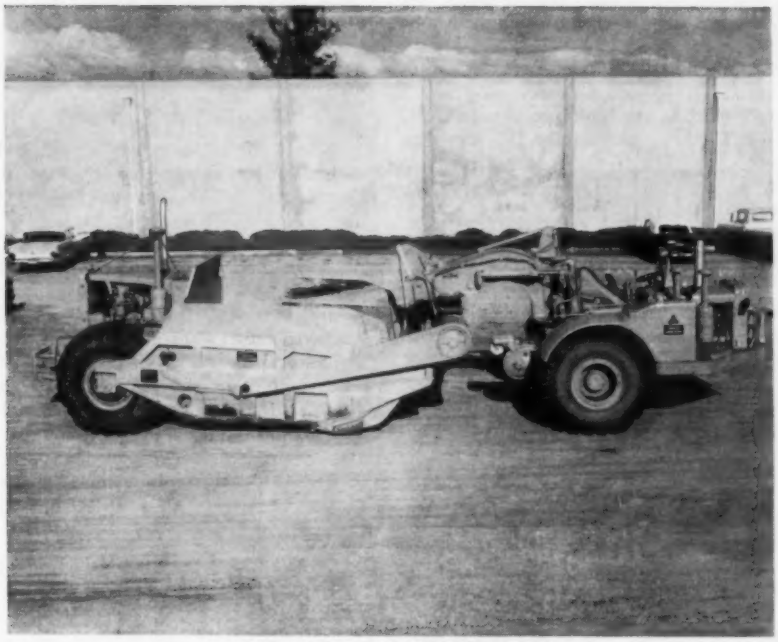
Street _____

City _____ State _____ 10-61

NOT GOOD AFTER NOVEMBER 15, 1961

NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.*



The "Jobmaster" Earthmover

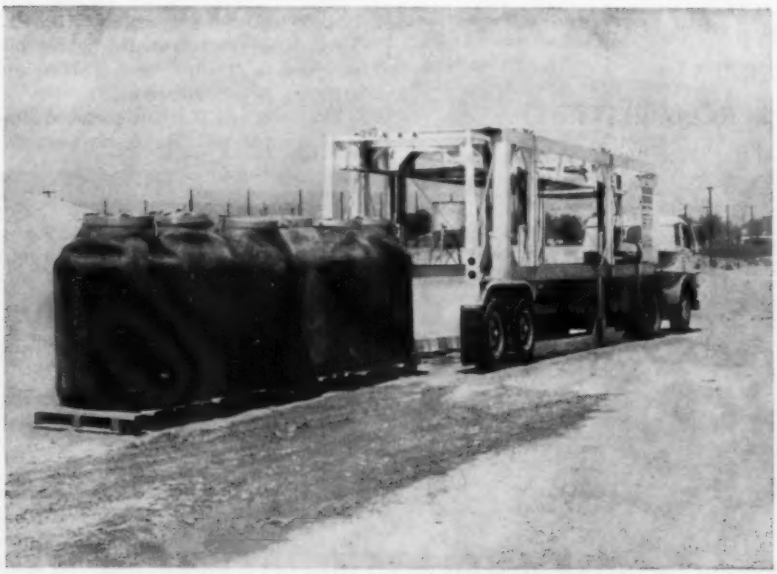
Added Earthmover Power

A newly developed attachment for Caterpillar 630 and 631, Series A and Series DW 20 and DW 21 earthmovers has been developed by the Shepherd Machinery Co.

Called the "Jobmaster," the attachment utilizes the 170 bhp Caterpillar Model D330A or the 245 bph Caterpillar D333A diesel engine, mounted directly on the scraper chassis, to provide "twin-engine" performance to the earthmover. Other features are: dual throttle control for both tractor and scraper power unit; air starting of the supplementary engine from the operator's console; fully automatic, three or six speed transmission speed changes in the tractor transmission effected by the operator; power to the scraper wheels delivered through torque converter drives; automatic power proportioning drive with application of power to the outside wheel for turning assistance.

Shepherd Manufacturing Co., Box 6789, Los Angeles 22, California

For more details circle 101 on Enclosed Return Postal Card.



Straddle Trailer Ready to Pick Up Load

Straddle Trailer

A new trailer that backs over the prescribed load, and with a hydraulically powered lifting mechanism that picks the load up for transport to work sites has been introduced by Challenge-Cook Bros. Inc.

In the accompanying picture 9 cu. yds. of pre-packaged ready mixed concrete material was contained in the six rubberized bags. Each bag weighed close to 3,000 lbs. The materials were to be delivered from the concrete producer to the job site. When the load reached the actual work site the trailer, called the C/CB Straddle Trailer, let down the cargo and drove off. The trailer is capable of traveling at rapid freeway speeds, reports the manufacturer.

Challenge-Cook Bros. Inc., 3334 San Fernando Rd., Los Angeles 65, Calif. The C/CB Straddle Trailer w/Load

For more details circle 102 on Enclosed Return Postal Card.

*To readers outside of the United States—postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, U.S.A.

Traffic Safety Markers

New, easily stored and carried traffic safety lane markers that have interchangeable yellow tubes set in separate 10-in. square molded bases has been introduced by Stokes Molded Products.

The tubes come in lengths of 12-in. to 72-in. in increments of 12-in. and reportedly provide excellent visibility,

Stokes Safety Lane Markers

especially in the tall sizes. The colors are molded in for permanency, and are made to resist impact. Entire units can be carried in car trunks and will accommodate standard accessory flags, warning signs or flashing lights.

Stokes Molded Products, Trenton, New Jersey

For more details circle 103 on Enclosed Return Postal Card.

New Huge-Load Hauler

To solve the problem of hauling loads that are much heavier than normal a nine-axle, heavy-duty tractor trailer unit has been designed by Art Brockman, Inc., and put into service by GMC Truck and Coach Division. Nicknamed "The Monster" because of its load hauling capacity, both the tractor and trailer are mounted on special air suspensions designed and built by Brockman.

Originally the tractor was a GMC Model BWX9000, a tandem-axle model powered by the high-torque 702 cu. in. GMC V-12 gas engine. To this has been added two more axles to give it four weight-carrying axles plus the front steering axle. It is designed so the weight carried by the tractor is spread evenly over the four weight-carrying axles. Half the total load is carried on the tractor, the other half on the four-axle trailer.

"The Monster"

GMC Truck and Coach Division, General Motors Corp., 660 S. Boulevard East, Pontiac 11, Mich.

For more details circle 104 on Enclosed Return Postal Card.

Safety Colored Fabric

A new line of fluorescent-color vinyl coated, nylon fabrics has been introduced by the Vulcan Division of Reeves Bros., Inc.

The fabric, which comes in red, yellow, orange and other colors, is used for safety flags and for conspicuous safety clothing of traffic policemen and traffic directors at airports and on construction sites. The vinyl coating of the completely waterproof fabric is impregnated with fluorescent pigments that give up a high light reflection during day and night.

Reeves Brothers, Inc., 1071 Avenue of the Americas, New York 18, N.Y.

For more details circle 105 on Enclosed Return Postal Card.

HOT OIL HEATER NEWS

BEFORE YOU BUY BE SURE YOU SEE CHILDERS NEW E MODELS.

- NEW COMPACT DESIGN
- NEW AUTOMATIC CONTROLS

A MAJOR STEP FORWARD IN RELIABILITY

CHILDERS MANUFACTURING COMPANY, INC.

FACTORY AND MAIN PLANT
P. O. BOX 6185 - STATION B
ALBUQUERQUE, NEW MEXICO

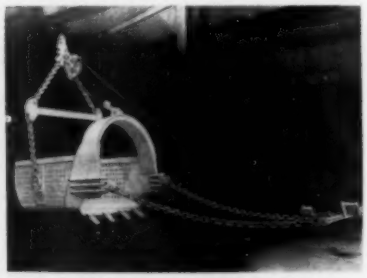
EASTERN DIVISION
P. O. BOX 4587
RICHMOND 29, VIRGINIA

...for more details circle 289 on enclosed return postal card

Dragline Bucket

The new "Featherlite" Omaha Dragline Bucket has been introduced by Drake-Williams, Inc. The manufacturer reports that a new shackle gives instant digging action, and when reversed is positioned for sloping with bucket below the machine. Also, the hitchplates are reportedly lighter but designed to reinforce bucket sides, and arch lip as they function.

Featured, too, is a hard-surfaced alloy steel lip that will take shock, wear and



"Featherlite Bucket"

operate at sub-zero temperatures with little danger of fracturing. The teeth have either 14 percent manganese steel, or H & L forged alloy steel bases and points, as desired.

Drake-Williams Steel, Inc., Omaha 8, Nebraska

For more details circle 106 on Enclosed Return Postal Card.

Truck-Mounted Line Striper

A new truck-mounted line striper equipped with four paint guns and able to lay both center lines and edge stripes at the same time has been introduced by the M-B Corp.

Center-line stripes may vary in distance from 8½ to 12½ feet from the edge of the roadway. Two side spray-

Truck-Mounted Line Striper

gun carriages extend on outriggers and are air controlled to lift off the ground as high as 6-in., allowing short distance non-striping moves with the outriggers extended. The paint tank compressor is a liquid-cooled rotary type, with 85 cfm delivery at 100 psi. Two bead tanks, a 420-lb. tank for the left-hand guns and a 300-lb. tank for the right, supply 6 lbs. of glass beads for each gallon of paint sprayed.

M-B Corp., New Holstein, Wis.

For more details circle 107 on Enclosed Return Postal Card.

Snow Plow Attachments

Two new snow plow attachments have been designed by The Warner & Swasey Company's for their Gradall machine.

One attachment is a V-type plow to be mounted on the front of the

Snow Attachments on W&S Gradall

Gradall for plowing a traffic path through the snow. The other is a one-way snow blade to push snow to one side of the roadway.

Warner & Swasey Co., 323 Republic Bldg., Cleveland 15, Ohio.

For more details circle 108 on Enclosed Return Postal Card.

Jet Stream Space Heater

A new, oil burning, jet stream portable heater that can be regulated from 20,000 to 80,000 btu/hr has been placed on the market by the Stow Mfg. Co.

Modulated by turning a knob the heater throws a jet stream of heat 25 feet out. It consists of a combustion chamber, a fan which blows air through the combustion chamber at a rate of 800 cu. ft. per min., and a starting switch that reportedly starts the heater instantly. The combustion chamber is made of stainless steel and aluminized

The Jet Stream Heater

parts, is designed like a plug-jet aircraft which has no exposed flame. A thermal over-run device automatically cools the heater after shut off.

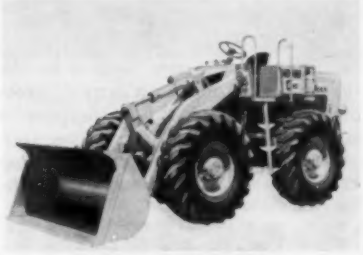
Stow Mfg. Co., 312 Shear St. Binghamton, New York

For more details circle 109 on Enclosed Return Postal Card.

Front End Loaders

Two new four-wheel-drive, rubber-tired, front-end loaders, the Model H-60 with 1¾ cu. yd. capacity and the Model H-70 Series C with 2½ cu. yd. capacity buckets have been announced by Frank G. Hough Co. The H-60 comes with gasoline or diesel engine developing 110 and 107 hp respectively. Tires are 14:00 x 24 - 12 P.R. The H-70 Series C is powered by a 148 hp diesel engine. Tires on this model are 16:00 x 24 - 12.P.R.

These new Payloader units have box-section boom arms located ahead of the operator's compartment. The single bucket-control cylinder is removed from areas of possible spillage.



The Payloader H-60

All pivot points on the steering, bucket and boom mechanisms are fitted with O rings or other seals. A stock of three

The Payloader H-70 Series C

hoses will service the hydraulic system. Each hydraulic system has a full-flow micronic filtering system. Four wheel, air-controlled power-brakes have dual foot-brake pedals that give the operator a choice of braking with or without transmission engaged. The hydraulic steering system uses two direct-acting rams. The new models have power-transfer differentials on both front and rear axles to provide added tractive effort.

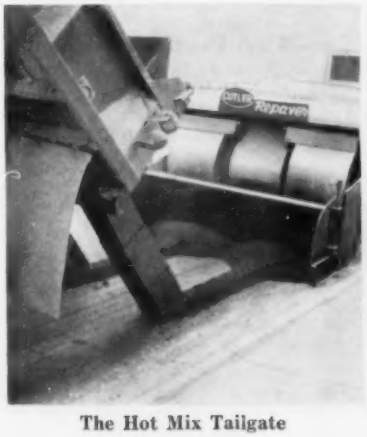
Frank G. Hough Co., 984 Seventh Ave., Libertyville, Illinois

For more details circle 110 on Enclosed Return Postal Card.

Hot Mix Tailgate

A new hot mix dump truck tailgate has been announced by the Cutler Engineering Co. The unit is specially designed to meter out two predetermined windrows of hot mix in front of the finisher.

The finisher distributes this hot mix to provide a smooth, uniform one-half



The Hot Mix Tailgate

inch mat of new hot mix seal coat. This special tailgate is developed to eliminate hand labor from the operation.

Cutler Engineering Co., 5435 E. 63rd St., Chicago 38, Ill.

For more details circle 111 on Enclosed Return Postal Card.

Model 205 Industrial Diesel Tractor

Industrial Diesel Tractors

The newest industrial tractor models, the 203 and 205 Series, both powered by a 152 cu. in., three-cylinder diesel engine developing 40 hp has been introduced by Massey-Ferguson.

According to the manufacturer, at a governed maximum speed of 2,000 rpm, the engine can absorb substantial loads down to a speed of 1,300 rpm before it is necessary to change into a lower gear. The 205 model is equipped with instant reverse and torque converter. The torque converter is an 11¾-in. self-contained unit that provides fluid drive. The two-speed transmission has a pair of hydraulically actuated multiple disc reversing clutches, and is compounded by a planetary reduction gear set on the output end of the main shaft. There are four speeds forward and four in reverse. Both models are equipped with disc type transmission brakes sealed against dirt and water, and power steering.

Massey-Ferguson, Inc., Block 1000 S.W. St., Wichita, Kansas

For more details circle 112 on Enclosed Return Postal Card.

1962 Chevrolet Trucks

Diesel power in the medium and heavy-duty models, two new larger displacement engines, broader power team options across the line, lower hood lines for improved visibility, and extra heavy-duty optional front suspensions are features of the Chevrolet truck line for 1962.

Other features include extended life mufflers on all gasoline engines, restyled radiator grills to include single headlamps in all but three series, optional alternating current generators

One of the New Chevrolet Trucks

on gasoline models, and directional signals as standard equipment on all but one series. Engines available for the first time in the truck line include one General Motors diesel—a 212 cu. in., 130 hp in-line four, and two gasoline V8's of 327 and 409 cu. in. displacement, developing 185 and 252 hp respectively.

Chevrolet Motor Division, GMC, General Motors Bldg., Detroit 2, Mich.

For more details circle 114 on Enclosed Return Postal Card.

Two-Way Portable Radio

A new personal portable two-way radio, to be used by municipal and state agencies and construction contractors and their suppliers, has been announced by General Electric Co.

The Voice Commander

Described by the manufacturer as small, light and compact, the VHF-FM man-carried communications unit has the transmitter and receiver in a single case. The unit, called the "Voice Commander," will be manufactured for high band frequencies (132-174 mc.) with one watt transmitter RF power output. The new equipment is 9.5-in. high, 5.3-in. wide and 1.7-in. deep. It weighs slightly more than 5 pounds. The radio is self-contained with a built-in microphone and speaker. It is designed with a two-section slide-open plastic case, with a handle that serves not only as a carrying piece but also performs a dual purpose as an auxiliary antenna for the receiver.

General Electric Communication Products Dept., P. O. Box 4197, Lynchbur, Virginia

For more details circle 113 on Enclosed Return Postal Card.

Ice Melter

The addition of two newly developed compounds to Revere Ice Melter has been reported by Revere Chemical Corp. The ice melting product is now said to have the penetrating power to melt a 2000 foot area in 26 minutes. The first addition, called "Penetral," reportedly enables the melter to penetrate through hard ice formation even during sub-zero temperatures.

The introduction of "Corsinite," to the melter is designed to retard rust and corrosion of metal surfaces. The manufacturer states that these additives are harmless to grass, shrubs, asphalt, tires and concrete. It is non-toxic and remains active, after it has melted, by retarding the accumulation of new precipitation for over 24 hours if not drained from the surface.

Revere Chemical Corp., 2010 E. 102nd St., Cleveland 6, Ohio

For more details circle 115 on Enclosed Return Postal Card.

The "B" means we rolled it at our Bethlehem, Pa., plant.

For quick, positive identification of Bethlehem structural steel...

LOOK FOR THIS BRAND

The "L" means we rolled it at our Lackawanna, N. Y., plant.

Steel

for Strength
... Economy
... Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

...for more details circle 284 on enclosed return postal card

New Products

Single-Stage Compressor

A new 4-cylinder, single-stage compressor has been introduced by Emglo Products Corp.

Said capable of running a hand-held rock drill, an 80-lb. paving breaker, or supplying the air needed for a ¼-in. sand blast nozzle, the "airmaster 75" will deliver full 75 cfm of air at 100 psi. Power for Emglo "75" is supplied

Airmaster 75

by V-belt or direct connection with any suitable electric motor, gas engine or power take off source. The four cast iron cylinders—operating with large-area, low-lift steel valves—are air cooled by the high-velocity fan-type flywheel. Efficient air cooling permits a light easier-to-service machine.

Amglo Products Corp., 116 DuPont St., Johnstown, Pa.

For more details circle 116 on Enclosed Return Postal Card.

Epoxy Adhesive

An epoxy adhesive on a new principle has been announced by Smooth-On Manufacturing Co. The new compound is said to be a soft gel, permitting easy application in thin film. Yet it adheres up to a 10-mil thickness without sagging when applied to vertical surfaces.

The adhesive, known as Sonite EA-40, reportedly hardens at room temperature following a one-to-one mix by volume. This standard mixing ratio emphasizes properties of shear and flexural adhesion. The manufacturer states further that if the adhesive is mixed two parts to one, what is believed to be a very high heat distortion resistance point, 217° F., is achieved without significant loss of other properties.

Smooth-On Manufacturing Co., 570 Communipaw Ave., Jersey City 4, N.J.

For more details circle 117 on Enclosed Return Postal Card.

Reversible Trip-Blade Plow

A new series of reversible trip-blade plows is announced by Wausau Iron Works. The manufacturer states that

Reversible Trip-Blade Plow

by locating the "A" frame assembly on top of the reversing frame ample road clearance and additional leverage for straight ahead push is provided.

Another feature of the plow is four heavy-duty self-cleaning, screw-adjustable compression springs. Two additional inner springs cushion shock and limit the trip of the entire moldboard to pass over obstructions without damage. Each plow can be set at five different plowing positions. Adjustable six-position push plates permit the plow to conform to various truck frame heights, the manufacturer reports.

Wausau Iron Work, Wausau, Wisconsin

For more details circle 118 on Enclosed Return Postal Card.

Two-Way Radio

A portable two-way radio requiring no operating license or permit has been introduced by Polytran Industries Inc. The manufacturer states that the completely transistorized radio transmitter and receiver, called the "CT-200," operates in pairs or with existing mobile and base equipment. Power is supplied from standard 9 volt dry batteries or rechargeable nickel-cadmium batteries. It has a press-to-talk switch and eight-section telescoping antenna. According to the manufacturer the radio is made to operate at maximum allowable power.

Two-Way Radio

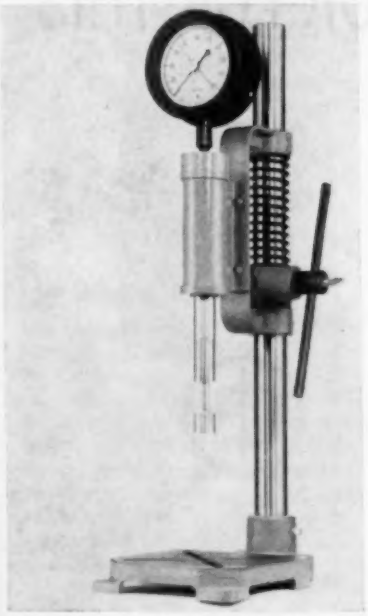
Polytran Industries Inc., 1010 Howard Ave., San Mateo, Calif.

For more details circle 119 on Enclosed Return Postal Card.

Measure Set of Concrete

A standard commercial model of the Proctor Penetration Needle for measuring the rate of initial set in fresh concrete is now available from E. W. Zimmerman Construction Chemicals, Inc.

The equipment, called "Acme Penetrometer," is designed to test the rate of hardening of mortars sieved from concrete mixtures by Proctor Penetration Resistance Needles, an ASTM test method. According to the manufacturer the tester is also designed to determine the rate of retardation of set induced by the use of retarding ad-



"Penetrometer" Concrete Tester

mixtures in concrete. The tester is equipped with six cadmium plated Proctor needles, a wooden case, and 100 copies of a laboratory form for reporting test results.

E. W. Zimmerman Construction Chemicals, Inc., 228 N. LaSalle St., Chicago 1, Ill.

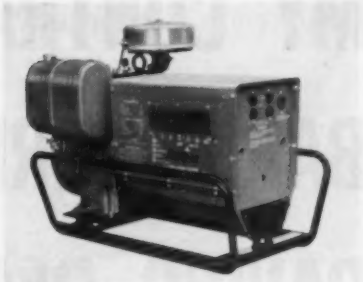
For more details circle 120 on Enclosed Return Postal Card.

A preliminary investigation and evaluation of sub-surface soil conditions prior to construction was made on a site outside of Scranton, Pa. with the AP Auger Drill by Acker Drill Co., Scranton, Pa., in combination with the Polerbore Auger, manufactured by Trainer Associates, New Castle, Delaware. The combination of the two pieces is shown in the picture. The Acker drill is designed with a 14′ spindle travel, and the Polerbore at 12″ and 18″ is devised to drill through rigorous soil conditions to 14′ levels. The penetrator point of the Polerbore, with its increased rake angle, enables the auger to enter the ground with additional force for effective penetration and clean exploration of subsurface conditions. The Polerbore was also used for large diameter borings to produce holes for concrete piles to support one-story structures, and to develop holes for utility lines.

Welder/Power Plant

A new, smaller model of their gasoline engine driven welder/power plant, the "Memco Bantam," has been introduced by Miller Electric Mfg. Co.

According to the manufacturer the plant's 12.3 hp. single cylinder Kohler



The "Memco Bantam"

air-cooled engine drives a rotating field generator to produce 180 amperes of a-c welding power on a 100 percent duty cycle; 3.5 KW of 115v 60-cycle single-phase power; 1 KW of 115v d-c power while welding.

Miller Electric Mfg. Co., Appleton, Wisconsin

For more details circle 122 on Enclosed Return Postal Card.

Rock Drill

A nine-foot retractable air leg rock drill, the "Long Tom," has been introduced by the Machinery Center, Inc. The drill consists of a balancing air cylinder and an extendable air cylinder.

A four-way pressure valve regulates air in the balancing cylinder providing air support for the drill rather than man power support. The extendable air cylinder maintains the drill point in constant contact with the ore. By adjusting the air pressure to the balancing cylinder the unit is held at desired height, and movement up or down is accomplished by pushing down or lifting the leg to the new position. The machine is equipped with a "goose neck" which allows positioning of the drill to any angle. According to the manufacturer the operator does not have to hold the machine when drilling a line on the rib holes or angling the drill for cut holes.

Machinery Center, Inc., 1201 S. 6th West, Salt Lake City 10, Utah.

For more details circle 123 on Enclosed Return Postal Card.

Wire In Big Rubber Tires

The use of shredded wire undertread to help off-the-road tires withstand operation in such places as mining areas, quarrying and road construction sites was revealed by Goodyear Tire & Rubber Co.

Lying between the fabric body of the tire and the outer tread, the rubber undertread contains millions of tiny pieces of built-in wire. The manufacturer states that this feature results in good cut-resistance, limits the growth of any cuts that do occur and gives better adhesion between tread and tire body. The wire is .0058-in. in diameter. In production, the wire is mixed in the rubber by a process in which force is exerted to assure an even, lasting dispersion of the wire. This wire-reinforced rubber then is formed into thin sheets which are laminated to form the undertread section of the tire.

Goodyear Tire & Rubber Co., Akron 16, Ohio

For more details circle 121 on Enclosed Return Postal Card.

New Products Continue on Page 118.

"MY CONTRACTOR POLL SHOWED BARBER-GREENE WAS THE BEST PAVING PACKAGE INVESTMENT"

SA-40 REPORT. Fast paving speed and ease of operation highlight foreman Bill White's comments on this new SA-40. White reports initial black base course (4" lift, 12' wide) was easily handled at 2000 tons per day.

MODEL 828 SELF-ERECTING STABILIZATION PLANT is one of four models in Barber-Greene line producing 200 to over 600 tph at lowest cost.

World's No. 1 Manufacturer of Asphalt Paving Equipment

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

Sherman Simpson, veteran Mt. Airy, N. C., contractor, tackles first asphalt paving jobs with 894 BatchOmatic and SA-40 Finisher after checkup on competitive equipment

Contractor Sherman Simpson, Mt. Airy, N. C., tells why he bought a Barber-Greene paving equipment package when he recently branched out into the asphalt paving field:

"In my 32 years association with contractors, the name Barber-Greene seemed to stand out among asphalt paving equipment manufacturers – but I wanted to be doubly sure. So, I polled some good contractors. Barber-Greene and two other makes were most recommended. I went further and checked owners of this type equipment and found Barber-Greene way out front. That's when I ordered my Barber-Greene 894 BatchOmatic plant and SA-40 asphalt finisher."

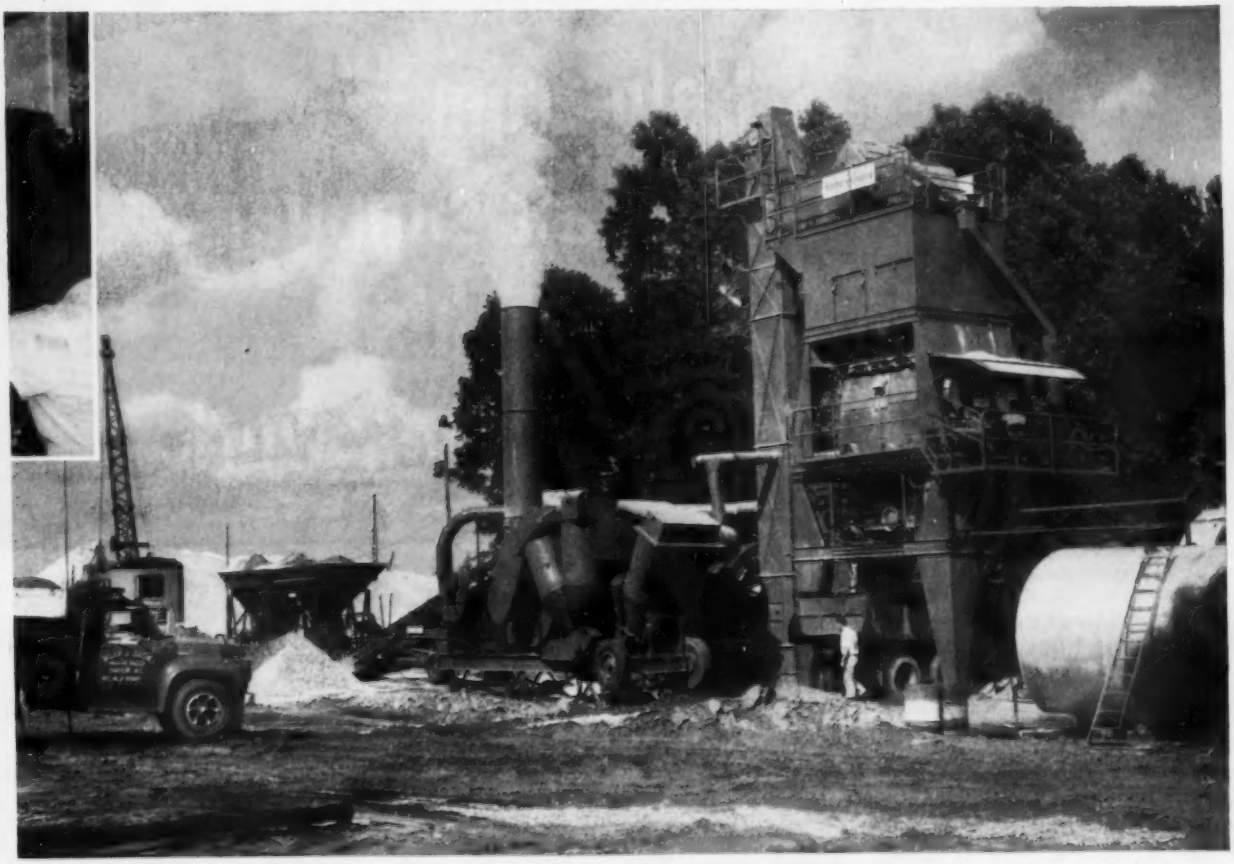
"I got another winner, too, in the distributor—Carolina Equipment Co. Past experience with them makes their people tops on my list," he adds.

When you need an asphalt paving equipment package, or just an asphalt finisher or stabilization plant, take your own contractor preference poll.

You'll get further proof why modern Barber-Greene BatchOmatic and Continuous asphalt plants are industry leaders for lower cost high capacity production, most accurate and automatic operation, lower maintenance, and the ultimate in portability when required.

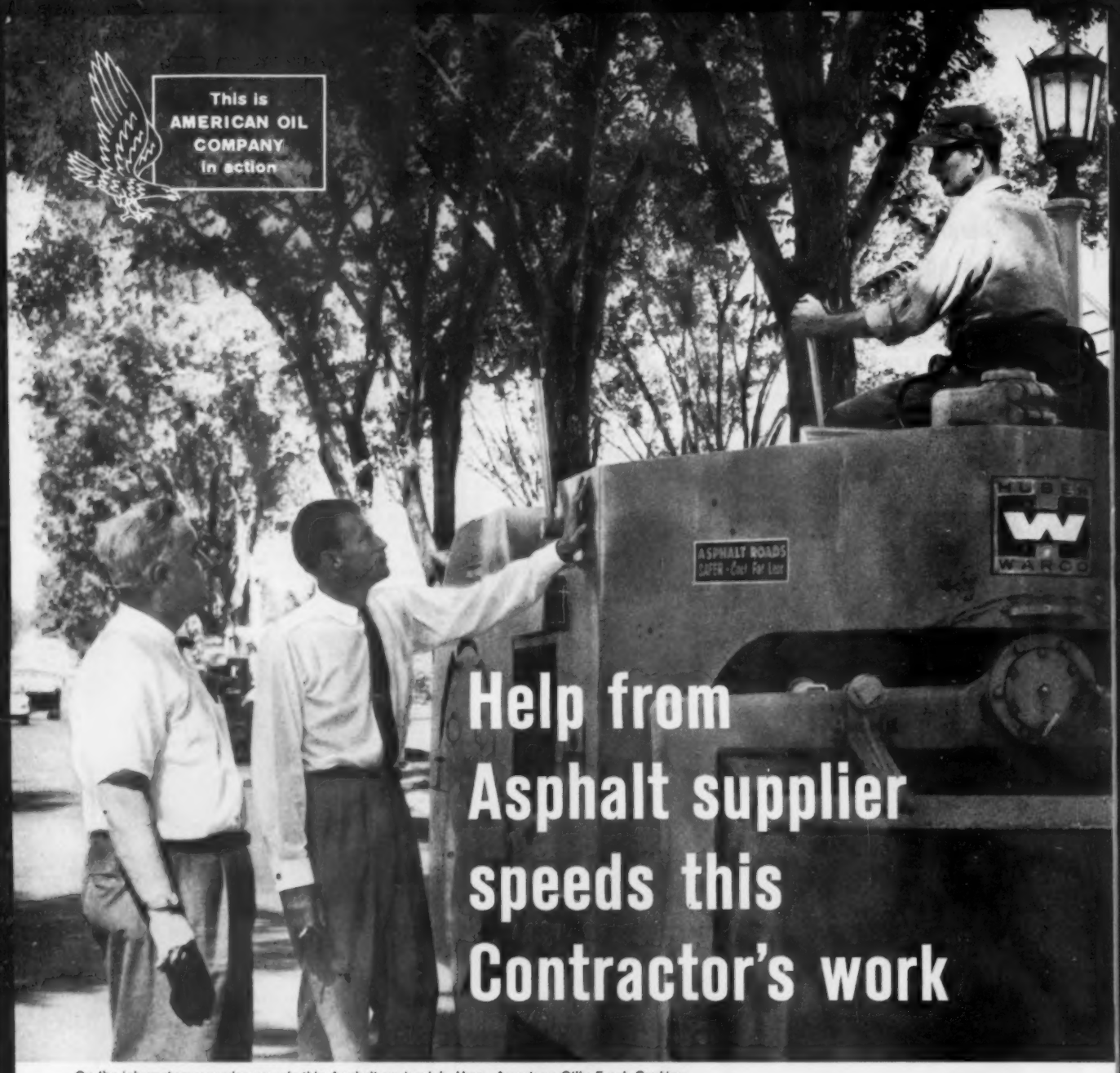
You'll discover Barber-Greene finishers—the General Duty SA-40 and 879-B, the Heavy-Duty SA-60 and SB-60 models, and the Compact 873 have one common feature: lowest cost paving per ton.

You'll find all sizes of Barber-Greene stabilization plants preferred for high capacity, controlled mixing with minimum maintenance.



33% PRODUCTION BONUS. Simpson's 894 BatchOmatic is shown mixing HB black base for road resurfacing job at China Grove, N. C. Plant Foreman, J. D. Young reports: "The 894 is rated at 1,500 tons daily, but we are mixing up to 2,070 tons of black base in 12 hours, and that included two hours of waiting for trucks." Plant is equipped with DA:65-CA:65 dryer-pac, four-bin cold feeder and a Model PA-70 conveyor. Contractor Simpson says, "We'll set this plant up on permanent location soon. Then, I'll need another plant and you can bet it will be a Barber-Greene." Closeup of automatic controls are shown at upper left.

...for more details circle 282 on enclosed return postal card



Help from Asphalt supplier speeds this Contractor's work

On-the-job customer service speeds this Asphalt paving job. Here, American Oil's Frank Cocking (left) and White Construction superintendent Frank White, check paving detail with roller operator.

by FRANK P. COCKING

About the author. Twenty-seven years' experience in such work qualifies Frank Cocking to speak with authority about providing help to customers. For the last eight years, Frank has devoted his entire time to selling and offering technical assistance to Asphalt contractors.

☆ ☆ ☆

When Appleton and National Avenues in Milwaukee were resurfaced by White Construction Company, we were able to help White make the job go smoother—and faster. Here's how:

The contract for the job, which was part of a State highway project, called for 2,500 tons of Asphalt. Because of our being headquartered in Milwaukee, we were able to stay right with the job to (1) provide assistance when needed and (2) make sure deliveries of Asphalt were there on time. Our Whiting refinery is only 100 miles away. Because of the proximity of this Asphalt source, White could set up tight delivery schedules with assurance that deliveries would be on time. Whiting is one of eight Asphalt-producing American Oil refineries strategically located across the nation. Fourteen permanent terminals and one mobile terminal, plus barge, boat, tank car, tank truck and even pipeline facilities are operated by American Oil to serve Asphalt contractors like White Construction Company.

☆ ☆ ☆

Would you like service from an Asphalt supplier such as White Construction receives? Call your nearby American Oil office.

AMERICAN OIL COMPANY

AMERICAN

910 SOUTH MICHIGAN AVENUE
CHICAGO 80, ILLINOIS

...for more details circle 280 on enclosed return postal card

Core from the 9-inch-base.

Bituminous features appear on pages 95 through 107

Black Base and Thick Subbase

Answer for Heavily Used County Road

By J. H. Rohlf
Superintendent, Allied Asphalt Paving Company

An old road in an outlying part of Cook County, west of Chicago, has been reconstructed to eliminate maintenance headaches and support heavy and growing traffic. The design and construction methods adopted for this 3-mile segment of West Bartlett Road demonstrate the new attention being given to securing adequately strong multi-layered flexible bituminous construction. A 9-inch-thick base of asphalt concrete is one of the noteworthy design features.

This road which was constructed by Allied Asphalt Paving Company, of Hillside, Illinois, was given a total of 12 in. thickness of asphaltic concrete including 9-in. base, 1½-in. binder course and 1½-in. surface course. The base course was underlain by 6 in. of granular subbase, increased in one area to 10 in. due to poor subsoil conditions.

Subsoil Correction Problems

Allied started work shortly after award of the contract and witnessed the normal delays due to utility relocation and acquisition of right-of-way. After excavating had proceeded only a short time, it was noted that much of the subsoil was impregnated with peat and other unsuitable material. Handling of excavation was kept at a normal rate by the close cooperation of the Cook County highway department's resident engineer, Larry Berens, and chief construction engineer John Skuba. All unsuitable areas were excavated immediately; others, where the soil was considered borderline, were left in place for later observation during the subbase and base course construction operations.

A few failures occurred after the granular material had been placed and heavy trucks from nearby ready-mix and gravel plants had used the new roadway. These areas were excavated down into the subsoil to a depth where proper stability was obtained, and the entire depth then backfilled and compacted with subbase granular material. A few additional failures did not become evident until after the first lift of bituminous base course had been placed. These were handled in the same manner as above, except that it necessitated placing of a bituminous base patch in order to assure uniform thickness of the asphalt over the entire roadway. The unsuitable areas ranged in size from an average of 30 ft. in length and 12 in. deep, to one large area 500 ft. in length and an average of 5 ft. in depth.

Granular material was also used as backfill in this latter area, in order to insure bridging action over a peat bed 20 to 25 ft. in depth indicated by soils borings.

Repaved West Bartlett Road, showing one of the heavy ready-mix trucks from an area commercial plant, typifying the heavy traffic this road gets despite its "secondary" rating.

Subbase Construction Methods

The subbase granular material was deposited directly on the compacted graded subsoil and bladed to proper grade. It was constructed to a width of 26 ft., as may be noted on the typical cross-section drawing. The 6-in thickness was placed in one lift; and where 8 in. or more, in two lifts. Only minor touch-up was done during final grading, to assure uniformity of gradation throughout the subbase.

Subbase compaction was obtained using an Austin-Western 10 ton 3-wheel steel wheel roller and an International Vibro-Tamping machine. Initial compaction was accomplished using the vibro-tamper while the material was slightly below optimum moisture content. Due to the dryness of the weather, additional water had to be used prior to, and after, rolling with the 3-wheel roller.

The finished subbase was then tested using a 25-ton Ferguson rubber-tired roller, and a few minor areas again tamped and rolled to assure proper compaction and stability.

This method of construction resulted in final compaction tests all falling within the requirements of the specifications, which were "to secure not less than 90 percent of the maximum density shown on the dry-weight curve determined by the compaction test."

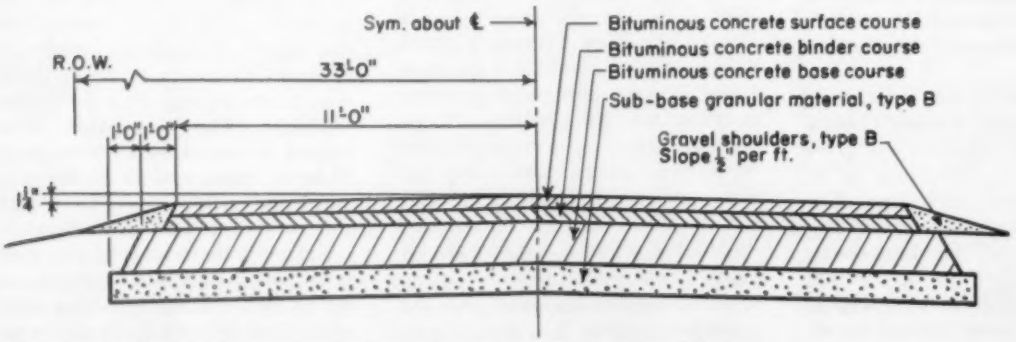
Black Base in Thin Lifts

The 9-in. bituminous concrete base was placed in four 2¼-in. lifts using a Barber-Greene machine: the first lift 25 ft. wide and each succeeding lift narrower to top out the base at 24 ft. The binder and surface courses were then placed 22 ft. wide.

Initial compaction of each lift was obtained using the 10-ton 3-wheel steel-wheel roller, followed by the 25-ton rubber-tired roller. Finish rolling was by a Buffalo-Springfield 8-ton tandem. The rollers were operated at speeds not exceeding 150 ft. per min. Tires on the rubber-tired roller were checked daily to insure constant 60 to 70 psi.

The specifications provided that "after final compaction, each layer of the bituminous concrete mixture shall have a theoretical density of not less than 95 percent of the maximum possible density of a voidless mixture composed of the same materials having like proportions." Theoretical acceptable density as calculated by J. McTigue, Cook County's engineer of materials, called for a specific gravity of 2.40. Results of tests indicated that Allied had obtained an average of 2.41 or 2.42, or 98 percent of maximum possible density.

This success was attributed to constant attention on the part of the engineers and Allied's supervision using the combination of rollers as outlined above. Cores were taken each morning on the previous day's run using a water-cooled, diamond-tipped electric drill coring machine. The 4-in.-diameter core samples were tested for thickness and density at the County Materials Laboratory. Results were given to resident engineer Berens



Cross-section showing the pavement elements in the heavy Bartlett Road design.

on the same day, so that changes in methods or amount of rolling could be made immediately if results were found to be unsatisfactory.

Only one lift could be placed during each day's run so that the material could cool out during the night prior to placing the next lift. No traffic was allowed over the newly placed material during this cooling period. The specifications required the contractor to maintain the road open to traffic at all times. It became somewhat of a problem to Allied to assure sufficient working area to guarantee a continuous daily operation. Shoulder areas had to be made available in order to insure two-way traffic overnight.

Careful and constant attention on the part of all concerned resulted in success in this regard. At no time was the road ever closed to traffic. Nor did the managers of the adjacent ready-mix or gravel plants, who were operating at full capacity at that time, ever complain of being delayed in their trucking. The supervising personnel of both the County and Contractor point with pride to this record.

The entire construction operation for the 3-mile 2-lane job included 45,000 cu. yd. of earth excavation, 25,000 tons of granular material, 25,000 tons of asphalt concrete, and various other drainage and miscellaneous contract items. Work started in July and was completed in October, 1960.

Bituminous Concrete Mixtures Used in Bartlett Road Project

Passing	Retained	Specifications Requirements	Tolerance Limits	Results of Test on Typical Sample
		Base Course and Binder Course		
1 in.	¾ in.	8%)		
		)	26.5-36.5%	31.1%
		23.1)		
½ in.	4	17.8)		
		)	26.2-36.2	31.1
4	10	12.3)		
10	40	10.0)		
		)		
40	80	11.8)	24.5-30.5	28.4
		)		
80	200	6.6)		
200		4.6	3.5-6.5	4.6
Bitumen PA-6 (60-70 Pen.)		4.8	4.5-5.1	4.8
				100%
		Surface Course		
½ in.	4	36.2%		
			54.0-60.0%	57.2%
4	10	21.0		
10	40	13.1		
40	80	11.8	29.3-35.3	31.6
80	200	6.7		
200		5.4	3.5-6.5	5.4
Bitumen PA-6 (60-70 Pen.)		5.8	5.4-6.0	5.8
				100%

Trenching in Close Quarters

"Special tools for special jobs" is a saying that paid off in this picture. Here the problem was to dig a trench for state highway illumination cables—without disturbing the already installed guard rail along the relocation of Route 9 at Middletown, Connecticut. A Gradall with a special 15-in. bucket did the job, with the help of an extension that permitted the operator to dig the 15-in.-wide by 30-in.-deep trench by reaching over the guard rail. The machine "raked out" the trench with a minimum of position change as the job progressed Peter's Gradall Rental Service of West Haven, Conn., was able to dig 2,500 ft. of trench per day through red rock.

Views and Comments

By H. G. Nevitt

Black Bases

AS WE have at times commented, black bases are becoming increasingly popular. This is the result of their demonstrated merit, and the trend to them will undoubtedly be accelerated by our increasing traffic concentration. They have received mention in our previous discussions, particularly those devoted to multilayer construction. These discussions have indicated the reason for their popularity, and touched upon the necessary requirements and precautions in their use. It however seems desirable to bring these comments together in a discussion devoted entirely to this subject.

We first need some clarification of what we are talking about, since the term "black base" has been applied to any layer (other than the top one) which contains asphalt. Really there are three types of such layers – one strictly a soil stabilization, the other two more closely resembling the conventional base course plus asphalt. From a functional viewpoint black bases can be classed as two varieties, the stabilized soil layer being merely a specialized form of the second.

The first variety is an asphalted layer immediately below the pavement course. It is normally constructed of cheaper aggregate, and has lower values of frictional and flexural resistance, though sufficient for the purpose. The second is an asphalted layer well down in the structure, sufficiently deep to provide both direct and indirect flexural resistance. However, it is usually provided for other reasons – either to utilize low friction aggregates, as with fine sands, or to protect the layer or those above it from deleterious changes due to water infiltration; such flexural resistance as is provided is merely an added benefit, though a substantial one.

From the functional standpoint the first type merely accentuates or adds to the action of the regular asphalt mat, increasing its ability to distribute load by containment or reverse flexure effects. Due to its lower position the black base course does not need quite the same strength as the pavement layer proper, and this often means that economies can be effected.

Functionally the second variety can provide some direct flexural resistance as well as perhaps increase the reverse effect. The first can be true even if the layer is in contact with the pavement courses: the criterion of the amount of direct flexural resistance provided is the ratio of the total depth to the bottom of this black base to the total thickness of the effective structure.

Two points must be kept in mind in connection with this second variety, or true black base. The first is that the layers above it must have sufficient shear resistance to transmit the flexural support it can provide. The second is that, as previously noted, these benefits can be obtained by proper design even though the principal reason for asphalting this base course was to obtain water resistance in order to maintain the needed aggregate properties

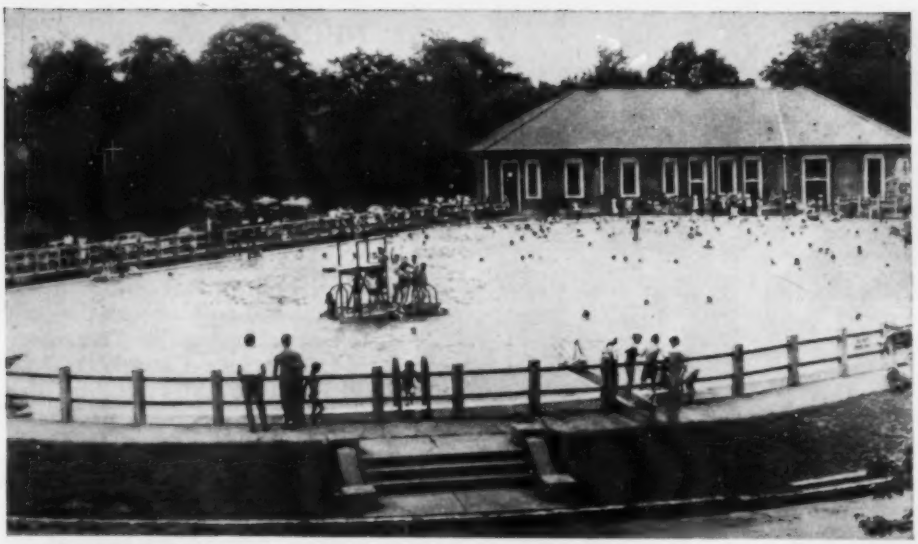
The requirements for these black base courses follow from the functions they perform (or should perform). This is so even though it is true that such has not always been the case – that is, black bases have not always been built to best meet these functional needs. The assumption apparently has been that the presence of the asphalt binder alone would automatically assure meeting the needs, which is of course not true.

The structural benefit given by black bases is primarily derived from the flexural resistance added, hence the design should be such as to assure this. This means essentially three things – as dense a gradation as is practicable, optimum film thickness (averaging 8 microns or more) and an asphalt of the proper final consistency. All are important, but the second is probably most in need of stressing with modern heavy duty pavements in view of the present tendency to thin film design. Otherwise a layer will be obtained which is dense and strong but likewise brittle and susceptable to fatigue.

The more presence of asphalt does not mean that water effects do not need watching. Any susceptibility to water infiltration or film replacement by water will jeopardize the benefits noted. Water resistance must be assured, with resort to additives if necessary. And it should be observed that the tight mix desirable for flexural strength is likewise the best one to help prevent moisture infiltration. It follows that the optimum black base is a well graded and well compacted layer to the degree premitted by the technical and economic limitations.

What is the situation today with respect to black bases? It seems mainly that they are being used with increasing frequency, but often on the basis of an empirical approach resulting from previous good results. As a consequence they are not always built in complete accord with the principles outlined here. Obviously this should be done for maximum returns, and it is clear they will be even more successful if this is done.

We can safely conclude that there is a brilliant future for black bases. The increasingly heavy traffic being encountered increases the advantages from the presence of flexural resistance, and an optimum design in accordance with engineering principles can assure these possible benefits to the maximum. We expect a steady increase in their use, which fits into our reiterated principle of getting the public the most for the money available.



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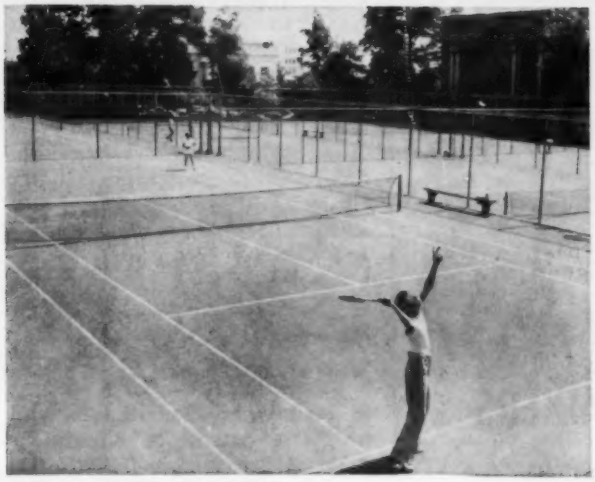

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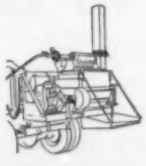

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NBCA Awards Its First Scholarship

The first scholarships to be awarded under the National Bituminous Concrete Association's Quality Improvement Program were anounced following NBCA's midyear meeting.

NBCA President Fritz Leffingwell reported that arrangements have been completed with the Massachusetts Institute of Technology and Ohio State University to underwrite fellowships in bituminous concrete research.

At MIT, doctorate candidate Edward M. Krokosky will prepare his thesis in the area of visco-elastic properties of bituminous concrete, under a fellowship sponsored by NBCA in cooperation with the Bituminous Concrete Association of Massachusetts.

At Ohio State, a fellowship has been established with the assistance of the bituminous concrete contractors in Ohio. Doctorate candidate Charles A. Pagen will pursue studies in the field of asphaltic concrete and granular base courses, particularly the dynamic elastic properties and the inelastic response to loads.

THE DEVELOPMENT OF A METHOD of maintaining longitudinal and transverse control of bituminous pavers is described in Bulletin 280 published by the Highway Research Board, National Academy of Sciences—National Research Council, 2101 Constitution Ave., Washington 25, D.C., for $0.60 per copy.

Frank M. Drake, general construction inspector for the Kansas State Highway Commission, reports on attachments which help paver operators to keep screeds on a smooth grade line with a definite uniform crown.

The method requires ascertaining a new grade line from the original profile and the use of pneumatic-tired rollers for compaction, but eliminates over-all work on the part of the contractor. Skin patching can almost always be reduced and in some cases eliminated, the author claims.

"These controls have produced gratifying results," Drake reports. "Sagging and bulging centerlines have been replaced with graceful lines."

Workers position sled prior to start of day's bitiuminus resurfacing. Sled moves under machine to position where it irons out the fabric as the paver travels.

Reinforced Asphalt Overlay Gets Controlled Test

A section of reinforced asphaltic concrete highway resurfacing described as a 'completely controlled' experiment, was completed this past summer by New York State. The project covered 1½ miles of US 44 east of Poughkeepsie in Highway District 8.

Although the existing pcc pavement was generally in fair condition, several of its 40 ft. long slabs had one or more transverse cracks or corner cracks. This condition considered with the need for widening the old 18 to 20 ft. pavement to the present 24-ft. standard, influenced district engineer Kurt G. Rauer and his staff to construct the test overlay using wire fabric reinforced asphaltic concrete.

Rauer felt that the placement of welded wire fabric in the asphalt mix over the joints between old pavement and widening sections, and over the transverse joints and cracks would be an effective try-out of the fabric's ability to reduce 'reflection' cracking in the new surfacing, long a bug-a-boo in this type of construction. The control and competitive testing established by the engineers consisted of the deliberate omission of the steel fabric from certain entire segments, and from over some transverse cracks.

To assure accurate test results in future years, a careful slab-by-slab crack survey was made and plotted, with actual location of all breaks in the pavement pinned down to the inch by reference to station markers along the right-of-way.

Engineer and worker snap chalk line, marking placement of welded wire fabric sheets.

Single worker handles 13 ft. long, 7½ ft. wide sheet of welded wire fabric. He will place it adjacent to curb side strip previously placed. In background his truck is loading hopper of bituminous paver.

One variation in control test: Note strips of welded wire fabric protruding out from under 1½-in. course of mix at joints (seen at left of roller and some distance beyond). In distance: other test variant, unbroken expanse of wire fabric.

This survey also shows exactly where the steel fabric was placed and where omitted.

As a further check on the results in future years, the Bureau of Physical Research, New York Department of Public Works, made one of the first major uses anywhere of a new continuous strip photographic process, by which was recorded pictorially every inch of the pavement *before* the resurfacing work started. A similar photographic record will be taken in several years, and a side-by-side comparison made in order to check the steel fabric's effectiveness in reducing cracks.

Construction of the $148,312 contract was done by Callanan Road Improvement Company, South Bethlehem, N.Y. Although this was the contractor's first experience with fabric-in-asphalt construction, the job was done with only the minor hitches attendant on unfamiliar procedures, and a satisfactory rate of placement of well over 500 tons of mix per day was reported after the first day.

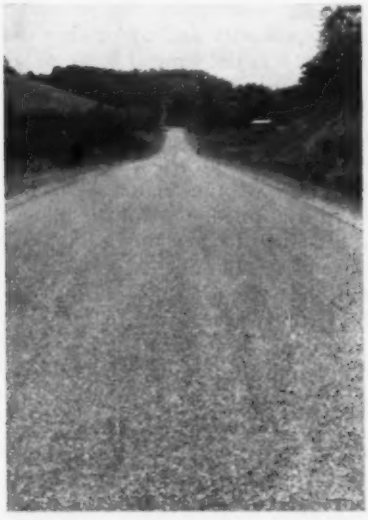
The principal problem was proper adjustment of the rails and sled which rode outside of and between the paver's tracks to 'iron out' the steel fabric, keep it down in the mix, and prevent the fabric from becoming entangled in the paver's distribution screw. After a short test run of a few slab lengths the day before major construction started, the contractor's men decided to extend the trailing ends of the sled and rails *completely* under the conveyor screw, to eliminate catching of the wire fabric.

This alteration was done overnight, and the next day (start of full-scale work) the paver rode over the mesh and placed a normal mix tonnage. The contractor's ability to place a 1½-in. course of asphaltic concrete over wire fabric with only minor delays is attributed to careful workmanship and close supervision. Based on the experience of previous fabric-in-asphalt jobs, this thickness is slightly less than the 1¾ in. minimum thickness (compacted) in which fabric has been readily placed.

Indicative of the contractor's care and ingenuity was a change made in the firm's Cedarapids bituminous paver, Model BSF 2. The paver is electrically controlled by

Continued on page 114

Mixing and placing a Cationic Bitumuls "mat" with a Moto-Paver. Note how closely the roller follows the paver.



This is a completed Cationic Bitumuls Drag Seal Job.

North Carolina forces apply cover aggregate to a Cationic Bitumuls Split Seal on 8.1 miles of State Highway.

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Since 1958, when we first introduced Cationic Bitumuls, it has gained steadily in acceptance by State Highway Engineering Departments all across the nation. Now, in twenty-one of our fifty states this material is in actual use. It is being tested and evaluated by many more.

Here's how one State took to Cationics

In 1958, The State Highway Commission of North Carolina took delivery of 100,000 gallons of Cationic Bitumuls so that one of their fourteen Divisions could do experimental work. When the results were evaluated here's what they found:

1. Early rains didn't damage the work.
2. The roads could be opened to traffic sooner.
3. The surfaces held more cover stone.

Based on these performance reports, the Commission made Cationic material available to all fourteen Divisions. In 1959, they used a total of 4,000,000 gallons. Last year (1960) 8,500,000 gallons!

How Cationic Bitumuls is used in North Carolina

North Carolina uses Cationic Bitumuls for two basic types of work: Split Seal, Drag Seal (Double Surface Treatments), Single Seal, Triple Surface Treatments; and Moto-Paver Mixes. Aggregates used vary from one area to another but the principal ones are gravel, granite, slate and limestone. Cationic Bitumuls performs uniformly well with all of these.

Cities, too, adopt Cationics

Many cities in North Carolina have switched to Cationic Bitumuls for much of their street and road work, profiting by the experience of the State Commission.

This same process is going on all across the country as more and more engineers become familiar with the high-level performance of Cationic Bitumuls.

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Worker adjusts towing chain for rail which rides just outside of cat track and performs ironing out function similar to sled between tracks. Paver is a Cedarapids Model BSF 2.

Paver has driven over the sled, and, after worker fastens tow chains (see left of sled), paver will move up about another foot, and sled will then be in proper position to 'iron out' the fabric.

ASPHALT OVERLAY

Continued from page 101

micro-switches. Speed of the tracks may be pre-selected from 11 to 189 ft. per min., with the paver moving to the selected speed by the flick of a switch at the operator's console.

But because an abrupt rise to paving speed might cause the tracks to slip over the steel fabric, Callanan superintendent Williams designed and built into the paver a 'gasoline decelerator.' This was simply a spring-tensioned, pedal-controlled throttle in the gas line which, when pressed down by the paver operator, decelerated the engine to idling speed. When the operator started up, he first threw the micro-switch to engage the clutch, and then eased his foot off the 'decelerator,' and let the tracks gradually rise to the pre-selected speed.

As a further precaution against slipping, the contractor scattered hot mix over the steel fabric out in front of the tracks.

Callanan Road Improvement Company's contract included not only the resurfacing but also placement of some drainage pipe and widening of the highway, in either two 3-ft. strips or one 4-ft. strip. The widening consisted of a foot thickness of gravel, topped by 6 in. of asphalt plant mix. Stabilized shoulders were built up to the edge of the new pavement from the new ditch line.

The resurfacing operations were accomplished in this sequence: (1) an evener course of asphaltic concrete averaging 1½ in. thick, in selected locations; (2) the binder course (including the 3 x 6-10/10 welded wire fabric), of type 1A asphaltic concrete, with ¾-in. max. stone; (3) a 1½ in. surface course with type 1A mix (½-in. stone).

All fabric sheets came in 13-ft. lengths and widths of 5, 7½ and 8 ft. The 5 ft. wide sheets were used over longitudinal joints, the 8 ft. widths over transverse joints and cracks, and for full width reinforcing of the 24-ft. wide highway, two 8 ft. wide sheets and one 7½ ft. sheet were butted, allowing 3 in. clearance on each side.

In positioning the fabric sheets the usual past practice has been to place *up* the wires parallel to the axis of the pavement, in order to ease passage of the paver over them. However on this job no trouble occurred when the *transverse* wires were sometimes faced up in order to make the sheets lie flat.

Where necessary, for example when the paver was about to move up onto a first sheet of wire fabric in a reinforced section, the edge of the sheet nearest the paver was secured with concrete nails to the underlying evener course of asphaltic concrete. The 6,000 ton project was completed by the contractor in 14 days.

Project engineer for the state was David P. McCoy, under assistant district engineer M. N. Sinacori.

New Asphalt Term

The sliding plate microviscometer, an instrument for measuring the viscosity and consistency of asphalt, was the central topic of a Symposium on Microviscometry at ASTM's recent annual meeting. This instrument consists of two small plates, between which a very thin film of the material to be tested is applied. One of the plates is attached to a balance-like arrangement. The force necessary to pull one plate along the surface of the second is measured in the balance-like arrangement and gives some indication of the viscous properties of tested materials.

Since asphalt is a complex mixture of organic materials containing extraneous material, the physical properties are difficult to define. Sometimes asphalt acts as a liquid and at other times it has the properties of a jell. Asphalt technologists, highway engineers, and others have found that for engineering purposes a clear understanding of the viscous properties of the material is extremely important. The exact measurement of viscosity in asphalt is not a simple matter, and this symposium centered on one method that appears to have promise. An ASTM bulletin notes that while the instrument cannot be used for quality control purposes at this time, it appears that it may be used for research work so that it can be developed into a control apparatus.

Bituminous Paving Mixtures ASTM Session Topic

The evaluation of bituminous highway mixtures encompasses the study of many properties which have significant effect upon performance. A group of papers covering the most important of these properties was presented at the Session on Road and Paving Materials, at the 64th Annual Meeting of the American Society for Testing Materials, Atlantic City, N.J., June 25-30, 1961.

A laboratory-field study of hot asphaltic concrete wearing course mixtures was described by J. F. Goode, U. S. Bureau of Public Roads. Chief topic covered was the extent of degradation of dense-graded aggregate in hot asphaltic concrete during construction and under subsequent traffic. A joint project of the Physical Research Division, Bureau of Public Roads, and the Maryland State Roads Commission provided the technical data which covered degradation caused by compaction and by traffic as well as changes in pavement density. Air voids and their relation to pavement performance and asphalt hardening were discussed.

A limited number of test sections for the variables encountered in the study did not warrant specific conclusions. Mr. Goode stated that only minor degradation of the aggregate occurred during construction compaction and under traffic, not considered sufficient to effect surface behavior. It was not felt unreasonable that pavement densities would be in the range of 97 or 98 per cent of the minimum allowable percentage of laboratory density. Rapid hardening of the asphalt resulted from a high content of air voids in the pavement. Initial air void content should be no greater than nine per cent after adequate compaction.

Bitumen Content's Significance

The significance of variation of bitumen content in paving mixtures was discussed by J. H. Keyser, City of Montreal Testing Laboratory, with N. G. Gaudette, State Highway Commission of Wisconsin

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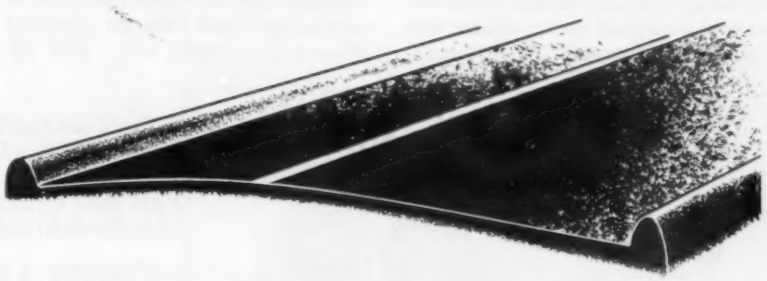


The desirability of using low penetration asphaltic cements in the construction of curbs, parking-lot paving and "stop-and-go" sections of highways has been demonstrated by extensive research. Tests conducted by The Asphalt Institute show that decreased penetration can be easily and effectively achieved by adding GILSAPAVE P-800 to a paving mix containing a penetration asphalt cement. The result is an improved mix possessing greater stability.

GILSAPAVE P-800 is a special preparation of pulverized Gilsonite. In "hot-mix" plant operations P-800 may either be stirred into the hot asphalt cement or mixed directly with the hot aggregate prior to the addition of the asphalt cement. As little as 4 lbs. of GILSAPAVE P-800 per ton of mix will modify an 85-100 penetration asphalt cement to the optimum of 50-70 penetration desired for asphalt curbs and gutters.

Due to its very low penetration, P-800 is superior as an additive to pulverized asphalts and will result in a lower price to the customer. It will also produce an asphalt of superior ductility.

To learn more about the many advantages of GILSAPAVE P-800 call or write American Gilsonite Company, Municipal Airport P. O. Box 15, Salt Lake City, Utah. Telephone DAvis 8-0311.

GILSAPAVE P-800

A PRODUCT OF AMERICAN GILSONITE COMPANY

(AFFILIATE OF BARBER OIL CORP. & STANDARD OIL CO. OF CALIFORNIA)

...for more details circle 279 on enclosed return postal card

as coauthor. This session brought out that precise measurement of bitumen content consistency is limited to the representative state of the sample and the accuracy of the extraction procedure. The chief purpose of the paper was to present information concerning the bitumen content variation that can be expected from centrifuge extraction test results for several common sampling conditions. Considering the variations inherent in sampling, extracting, and unavoidable variation in bitumen content and aggregate gradation, it was concluded that a standard deviation of 0.2 per cent bitumen is normal, and that 0.6 per cent has a realistic tolerance specification, assuming normal distribution. A recommended specification for bitumen tolerance is included in the paper.

R. S. Winniford, California Research Corp., presented a paper by L. E. Santucci and R. J. Schmidt, of the same organization, which described a method for measuring the volume of laboratory or field-compacted asphalt concrete specimens used for determining the density of paving mixtures. This procedure measures the volume directly after coring.

The importance of low air permeability for increasing the durability of asphalt concrete has been discussed by many authors. The paper presented by R. S. Winniford, representing the authors, T. C. Hein and R. J. Schmidt, California Research Corporation, presented a rapid method and description of apparatus for determining the in-place air flow rate through pavements. Data were included on field tests to show the application of the test equipment to measurements on pavements in place. The effect of density and voids on permeability was cited as well as the effect of construction procedures.

J. J. Heithaus, Shell Oil Co., discussed measurement of asphalt viscosity with a vacuum capillary viscometer. In the study of asphalt technology performance viscosity plays a prominent role. The viscosity of the asphalt near 140°F. is a direct measure of the suitability of the asphalt for paving applications. Measurement of bituminous materials in this viscosity range appeared to be uncommon and methods are relatively little known. In a survey of techniques available for measurement of viscosities from 10 to 10,000 poises a capillary viscometer was selected because of its wide range, small sample requirements, and convenience and simplicity of operation. W. J. Halstead, Bureau of Public Roads, further emphasised the apparatus as being the best tool now available for determining viscosities in the range that is too low for convenient use of the sliding plate instrument and too high for the usual sizes of gravity flow instruments.

Bituminous Surfacings

By A. Please. Journal of Applied Chemistry (14 Belgrave Sq., London, S.W. 1), Vol. 11, Pt. 2, pp. 73-80, February 1961. As reviewed in Highway Abstracts of the Highway Research Board, Washington, D. C.

An examination has been made of the results obtained by the Marshall test to determine the value of the test for the design of dense bituminous mixtures for road surfacings and for comparing their resistance to deformation.

It is shown that the optimum binder contents from the density and stability curves are similar to those specified in B.S. 594 for the driest schedules having the highest resistance to deformation and that the test would exclude those materials in the other schedules. In the absence of information on the relative deformation on roads of surfacings made with different types of bituminous material, simulative laboratory tests have been used to place compositions in order of resistance to deformation. Comparison on the results of the Marshall test with the Road Research Laboratory wheel tracking tests shows that neither the stability nor the flow value provides a valid measure of the resistance to deformation of dense bituminous materials in common use. However, for rolled asphalts the ratio stability flow correlates moderately well with the logarithm of the rate of tracking measured in the wheel-tracking machine; the correlation for dense tar surfacing compositions is poor. Comparison with the Hveem Stabilometer suggests that setting an upper limit on flow value is approximately equivalent to setting a lower limit on the internal friction. As with many mechanical tests, high Marshall stability values are promoted by high stone content, high viscosity of binder, rough-textured aggregate, not too low a filler content and good compaction.

TARCO "Arcrite" Spreader

—a gasoline **engine driven, centrifugal disc** spreader for dump truck **tailgate mounting** to spread **salt, sand, cinders** for ice and snow control; or sand and **chips** for sealcoating.

Special Features: 1. Extra heavy construction to take abuse; 2. Adjustable to tailgate in 3 directions —no material chute required; 3. Has vertical shaft bearing support; 4. Small storage space—in upright position; 5. NO-LOAD Engine Starting—for quick, easy start and longer engine life.

See your Tarco Dealer or write for details.

TARRANT MFG., CO.

25 Jumel Place, Saratoga Springs, N. Y.

...for more details circle 333 on enclosed return postal card

Roadside Maintenance

Chemical Mulch Tried for Erosion Control

Maintenance engineers on New Jersey's Garden State Parkway have applied the new chemical, experimentally to combat roadside erosion.

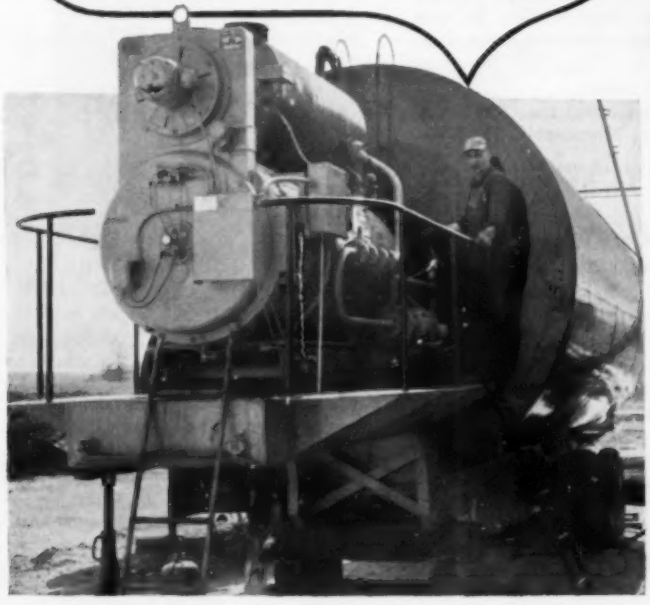
In some areas along this 173-mile highway the erosion problem is quite severe. Parkway landscape engineers have tested various kinds of vegetation, dug channels, and used fill to get roadsides back to grade in eroded areas. Hay and straw mulches were laid, but they drifted down slopes and clogged basins. The engineers also investigated the properties of the elastomeric polymer emulsion, Vulcanol which led to its recent trial.

A trial test was run by Alco Oil & Chemical Corporation. The trial covered about one-third mile alongside of roadside previously prepared by the addition of lime to bring up the soil's pH value. Fertilizer and seed were added and then chemical spraying with a Finn Hydroseeder. About one-third of a tank of the chemical was required, taking 30 to 45 minutes. The treated mulch dried in about two hours.

Volcanol treated mulch with seed and fertilizer being applied along the Garde State Parkway.

The chemical was designed to form a nonwater soluble coating which would stay in place long enough for seeds to germinate (one to six months). The chemically treated mulch speeds germination and subsequently the chemical decomposes.

"I start heating asphalt at 6 A.M. – by 7, I'm ready for mixing"



Cleaver-Brooks mobile asphalt storage-heater plant starts fast, works long hours for Fond du Lac County (Wisconsin) Highway Department. Mr. Earl Schaefer, supt. for Fond du Lac County Highway Department, speeds the work of his crews by having plenty of asphalt at penetration temperature from early morning throughout the day. To do the job, he relies on a rugged, fast-heating 15,000-gallon storage-heater plant — designed and built by Cleaver-Brooks.

Mr. Schaefer reports: "This is the first time I've been able to heat asphalt to application temperatures and have it ready for mixing when my crews arrive. We heat asphalt for 1100 tons of hot mix in 9 hours on a regular basis."

Cleaver-Brooks Peak-Temp heater and asphalt storage plant operates through all seasons without freeze-up, pressure or water problems. Check into this automatic, mobile method of heating and handling asphalt on the job. Write Cleaver-Brooks, Dept. L, 395 E. Keefe Avenue, Milwaukee 12, Wisconsin.

Cleaver Brooks®

ORIGINATOR AND LARGEST PRODUCER OF PACKAGED BOILERS

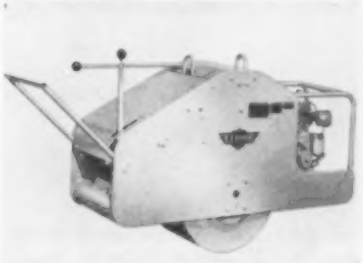
...for more details circle 291 on enclosed return postal card

NEW PRODUCTS

Continued from page 101

Self-Propelled Vibrating Compactor

A new model vibrating compactor, the VR-13W, which offers an equal ability to compact soil or asphalt has been announced by the Essick Manufacturing Co. The unit is 17¼" wide,



Self-Propelled Vibrating Compactor

7½" long, including handle, 36" high and weighs 700 lb. It is powered by a 4.8 hp air-cooled engine and equipped with a separate clutch to allow operation with or without the vibrating mechanism engaged. The machine propels itself at up to 1 mph in either forward or reverse. Only the guidance of an operator is said to be required.

The unit is designed for compaction in confined areas, around foundations and trenches, and is also capable of asphalt compaction for highway maintenance and patching.

Essick Manufacturing Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.

For more details circle 124 on Enclosed Return Postal Card.

20-Ton Fork Lift Truck

A new diesel-electric fork lift that reportedly can handle up to 40,000 lb. loads and operates on either paved or unpaved surfaces has been introduced by R. G. LeTourneau, Inc.

The machine, designated FLT-20, is designed to have many applications in industry where heavy material is presently being handled by cranes, according to the manufacturer. LeTourneau reports that the truck is completely electrically powered. Individual electric gearmotors placed at the point of work power the hoist, rack tilt and rear wheel steering. The three-wheel unit is powered by a 210 hp. diesel engine driving AC and DC generators. All controls are governed by electric switches. The control console is part of a revolving seat assembly that permits the operator to swivel and face the direction of travel, the manufacturer states.

The Fork Lift

R. G. LeTourneau, Inc., 2399 S. MacArthur, Longview, Texas

For more details circle 125 on Enclosed Return Postal Card.

New Backhoe Attachment

Designed for use with the NAPCO Crab tractor, the main feature of the new backhoe attachment by NAPCO Industries is that the unit can be completely disconnected from the tractor by one man in less than a minute, without the use of special tools or other equipment.

In place of the backhoe, when detached, is a loader counterweight that can be installed with equal ease by one man. The backhoe is capable of digging to a depth of 14-ft. Dumping height is 10-ft. The unit has heavy duty double acting cylinders. The backhoe can be powered with the same hydraulic system that is used for the front mounted 1-yd. loader.

Backhoe Attachment

NAPCO Industries, Inc., 7th St. & North Lyndale, Minneapolis 11, Minn.

For more details circle 126 on Enclosed Return Postal Card.

Portable Two-Way Radiophone

A new line of "Handi-Talkie" portable two-way radiophones with fully transistorized receivers, and weighing less than eight pounds has been introduced by Motorola, Inc.

The radiophone can be operated on normal duty cycles, and has extra duty dry battery packs. Rechargeable nickel-cadmium batteries reportedly provide 8 hours of operation per charge. The batteries can be recharged from a 117 volt AC charger or from a vehicular electrical source. Power outputs in the new units range from one to eight watts. Transistors are used throughout the units. Each unit is interchangeable with any of the power packs available from Motorola.

The Two-Way Radiophone

Motorola, Inc., 4501 W. Augusta Blvd., Chicago 51, Ill.

For more details circle 127 on Enclosed Return Postal Card.

Self Contained Compressor

A new series of air cooled stationary compressors designed to deliver from 200 to 600 cfm. of air at 250 psi. has been developed by Le Roi Division, Westinghouse Air Brake Co. Rating is supplied by three and six cylinder models.

The compressors operate with a load-unload pressure control system. According to the manufacturer compressors of this capacity and pressure have applications for high pressure drilling with down-the-hole tools on mobile equipment as well as production drilling in the oil fields. The air cooling system reportedly eliminates water supply problems.

Air Cooled Compressor

Le Roi Division, Westinghouse Air Brake Co., Sidney, Ohio

For more details circle 128 on Enclosed Return Postal Card.

New Lift Truck Series

Seven lift trucks featuring a new engine, new mast, forks and carriage, power steering as standard equipment, and providing capacities ranging from 6,000-lb. through 10.000-lb has been announced by Allis-Chalmers.

One A-C New Model Lift Truck

A six-cylinder "Power-Crater" engine, developing 77 hp, powers the new models. The masts are made of high carbon steel sections welded together to provide a rigid, permanent unit structure. Piston-type lift cylinders with self-adjusting inner seals, and friction reducing load rollers provide easier lifting and extended mast life, the manufacturer reports. Forks have a longer taper and rounded ends to facilitate getting under loads. A new hydraulic pump, larger capacity reservoir and filter are features of the hydraulic system. Hydraulic lines are steel tubing, wherever possible, to eliminate hose chafing and reduce maintenance cost.

Allis-Chalmers Mfg. Co., Tractor Group, Milwaukee 1, Wisconsin

For more details circle 129 on Enclosed Return Postal Card.

Plastic Bond For Concrete

A newly developed concrete bond, called Power-Grip, has been introduced by the Monroe Company, Inc. The material reportedly eliminates procedures of roughening, chipping, drilling, scarifying and washing when old concrete bases are to be repaired or resurfaced with new concrete. A permanently welded bond is created between the old and new concrete.

The manufacturer states that the new product can also be used in the concrete mix to increase its resiliency, cohesion and adhesion. Added to the mix it is said to increase the tensile and compressive strengths and makes concrete more resistant to abrasion, impact, oil and grease.

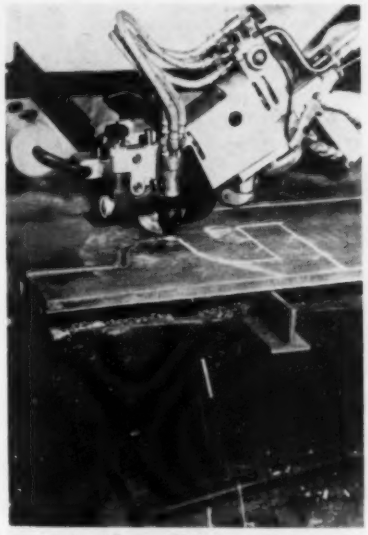
The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6, Ohio

For more details circle 130 on Enclosed Return Postal Card.

Flame-Cutting Machine

A new 19-lb. flame-cutting machine, designated the Linde CM-75 "Cadet," has been introduced by Linde Co., Division of Union Carbide Corp. According to the manufacturer fast, clean cuts in metals ranging in thickness from light gauge sheet to 2-in. thick can be made with the new unit. The machine is equipped with a clutch allowing instant free-wheeling control suitable for hand guided contour cutting.

The cutter is portable. It operates at speeds up to 30 ipm and can be



19-lb. Flame Cutting Machine

used with acetylene, propane or natural gas. A built-in speed indicator located directly in front of the operator indicates cutting speed.

Linde Co., Division of Union Carbide Corp., 270 Park Ave., New York 17, N.Y.

For more details circle 131 on Enclosed Return Postal Card.

Protection For Concrete

A formula giving three-way protection to concrete has been made available by Chem-Search, Inc. The new material, called "Tri-Kote," reportedly performs cures, seals and hardens freshly placed concrete and protects existing concrete surfaces. The product is applied with one application, and is said to penetrate up to ⅛", becoming an integral part of the concrete surface.

The manufacturer states that the treatment reduces maintenance costs by repelling salts, oils, greases, alkalies, mild acids and water. It reduces dusting, flaking, and stops hairline crazing.

Chem-Search, Inc., 336 Taft St. N.E., Minneapolis, Minn.

For more details circle 132 on Enclosed Return Postal Card.

Forced-Air Heater

A new heater, based on a concept that is designed to produce low-cost forced air heat has been introduced by Scheu Products Co.

The new heater utilizes features of the HY-LO oil-burning Salamander, and combines a new induced draft

Scheu Forced-Air Heater

principle that reportedly results in improved combustion and heat output. The heater stands 43½ inches high, and weighs 33 lb. It directs its flow of heat outward and downward. The burning rate is adjustable from 70,000 to 125,000 btu/hr.

Scheu Products Co., 297 Stowell St., Upland, California

For more details circle 133 on Enclosed Return Postal Card.

Bulk Pneumatic Unloading Compressor

A single stage air compressor for transfer of bulk materials such as dry cement, fly ash, and other materials in a pelletized, granulated or pulverized state has been announced available by the Worthington Corp.

The compressor, known as Model 20XC-1, has a reportedly high volumetric efficiency and can be connected directly or by belt to an engine drive. The unit operates at 1450 rpm, and the three 6-in. cylinders have a piston displacement of 196 cfm. The compressor is rated for continuous service at 30 psi using 24.2 bhp and intermittent service at 40 psi. The unit has the Worthington feather valve which has only one moving part, forced feed lubrication, and is complete with dry type filter-silencer.

Worthington Corp., c/o Walker & Crenshaw, 500 Fifth Ave., New York 36, N.Y.

For more details circle 134 on Enclosed Return Postal Card.

Revolving Flasher Light

The Roto-Flash, a twin-sealed beam revolving flasher light that projects 90 360-deg. beams every minute has been introduced by Tripp-Lite.

The light has a shock absorbing belt-drive which reportedly results in less maintenance in the field. Detachable

The Roto-Lite

clamps dismantle and reassemble unit without special tools. It is designed primarily for road working vehicles and is available in 6, 12 or 24 volts in a selection of colors.

Tripp-Lite, 133 N. Jefferson St., Chicago 6, Ill.

For more details circle 135 on Enclosed Return Postal Card.

Field Megaphone

A compact power megaphone, called the Super-Hailer, and designed for heavy-duty service has been produced by Audio Equipment Co., Inc.

The transistor powered 16 watt amplifier concentrates a directional sound beam to penetrate the high noise levels met in construction, marine, airport, public safety, and similar conditions. A one mile range is said to exist in quiet conditions. The self-contained power source consists of 10 D size, standard flashlight cells, rated at 3000

Field Megaphone

10-sec. messages. Its detachable microphone design makes the megaphone portable. It may be shoulder-slung, or operated on remote extension cable. Two units may be combined into a dual hook-up, operated by a single microphone.

Audio Equipment Co., Inc., P. O. Box 192, Port Washington, New York

For more details circle 136 on Enclosed Return Postal Card.

Tester for Sealants and Mastics

A dynamic tester designed to evaluate the many new sealants and mastics used in heavy construction, building construction, road work and etc. has been developed by Testing Machines, Inc.

The machine, the TMI Sika, makes extension tests, compression tests, variable rate of load application, force necessary for extension and compression, tests for maximum extension,

The TMI Sika Sealant Tester

fatigue failure and environmental testing. It has been found useful for new elastomeric sealants, according to the producer.

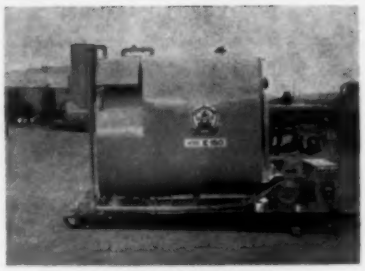
Testing Machines, Inc., 72 Jericho Turnpike, Mineola, New York

For more details circle 137 on Enclosed Return Postal Card.

Hot Oil Heaters

The new E Model series Circulating Hot Oil Heater has been announced by the Childers Manufacturer Co. According to the manufacturer the heater can be used with both stationary and portable asphalt hot mix plants and related storage heating, for bulk asphalt and road oil heating and industrial process heating.

This new model is automatically controlled with smaller control panels



Hot Oil Heater

and zone failure indicating lights. The burner is mounted on the combustion chamber door, which swings out for maintenance without disconnects. The heater may be skid-mounted or trailer-mounted.

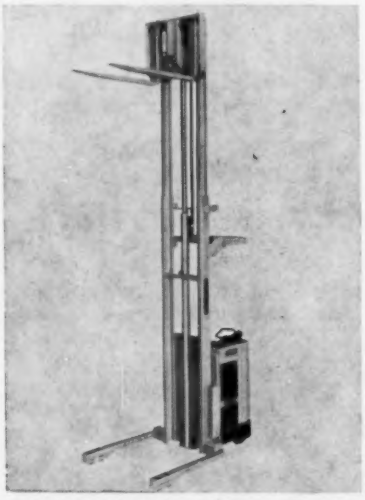
Childers Manufacturing Co., 2010 Sixth St. N.W., Albuquerque, New Mexico.

For more details circle 138 on Enclosed Return Postal Card.

Narrow Aisle Electric Trucks

More than 30 engineering changes are incorporated in the current line of 2000-lb. and 3000-lb. capacity electric straddle trucks manufactured by The Raymond Corporation. Opened masts have been designed for better visibility, and the over-all weight of the uprights has been reduced 10 percent to lessen the dead weight load of the truck.

According to the manufacturer, a



3000-lb. Capacity Electric Truck

ratio between collapsed and elevated heights has been worked out to provide maximum lift even when low masts are required to enter trucks and low doorways.

The Raymond Corp., Madison St., Greene, N.Y.

For more details circle 139 on Enclosed Return Postal Card.

ACCURATE · PRODUCTIVE · EFFICIENT and TOUGH

In digging like this no other excavator compares in productivity with a modern wheel-type trencher. Take a second look at that spoil bank. That's hard shale and rock-digging, right down to trench bottom. Piling up that spoil at a 4-foot-a-minute clip is a tough Cleveland J-40.

There are fundamental reasons why full-crawler, wheel-type trenchers like this—the trencher originated and perfected by Cleveland—are unequalled for trench production in hard digging.

The wheel is the strongest type of digging element and the stability of the full-crawler mounting permits maximum exploitation of its digging ability in continuous digging action. Simultaneous wheel rotation and crawler progress result in constant forward crowd of the wheel into the work with maximum utilization of power at the point of digging.

Higher wheel-speeds in relation to crawler-travel produce a fast-biting milling action that is most effective for digging shale, frost and similar conditions. Slower wheel-speeds produce powerful bites that forcefully chew out caliche, hardpan, coral and other hard formations. The continuous-digging, crawler-mounted, wheel-type trencher digs trench in all such conditions faster and more economically than excavators dependent on interrupted-cycle digging action.

Investigate now the profit potential of a modern trencher—a tough, fast, dependable Cleveland Trencher.

CLEVELAND TRENCHER®

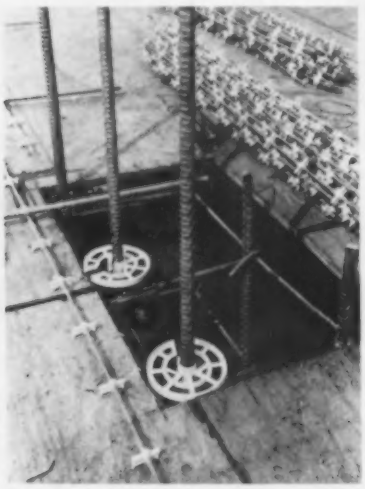
THE CLEVELAND TRENCHER CO., 20100 ST. CLAIR AVE., CLEVELAND 17, OHIO

...for more details circle 292 on enclosed return postal card

Concrete Reinforcement

New plastic accessories for reinforced concrete designed to eliminate maintenance caused by bleeding through of rust has been introduced by Universal Builders Supply Co., Inc. The products are derived from high density polyethylene produced by W. R. Grace & Co.

These new plastic accessories take the place of steel slab bolsters or concrete blocks, the manufacturer states. Instead of steel against steel, and the consequent electrolytic action that causes rust to bleed through concrete slab, steel rods are now supported by plastic slab bolsters.



Plastic Concrete Reinforcers

The three accessories include continuous slab and beam bolsters, mesh bolsters that snap into place and stay put to provide ample support, and plastic donuts for holding exact clearance between reinforcing bars and form face.

W. R. Grace & Co., Polymer Chemicals Div., 225 Allwood Rd., Clifton, N.J.

For more details circle 140 on Enclosed Return Postal Card.

New Adhesive

A development in adhesive technology has been claimed by Rubba, Inc. The new material, called Rubbapox, reportedly contains neither water nor solvents. It is 100 percent solids. A one-part adhesive that requires no mixing prior to use, the manufacturer states further that the product is waterproof and resistant to acids and alkalies, will adhere to almost any surface and has shown adhesion to some grades of polyethylene.

Rubba, Inc., 1015 E. 173rd St., New York, N.Y.

For more details circle 141 on Enclosed Return Postal Card.

Portable Utility Pump

A new, portable engine-driven pump, designated the "Pup," has been introduced by Peerless Pump, Hydrodynamics Division, FMC Corp.

The manufacturer suggests that some applications for the new pump are: dewatering excavations, filling reservoirs and emergency storm pumping. The pump has a wide bottomed base, 1¼-in. suction and discharge ports, and starts by a recoil starter atop the engine. The pump reportedly is capable of moving 3300 gal. of water per hour, powered by a 2½ hp. vertical engine.

Utility Pump

Peerless Pump—Hydrodynamics Division—FMC Corp., 301 West Avenue 26, Los Angeles 31, Calif.

For more details circle 142 on Enclosed Return Postal Card.

Electric Vibrator

An electric vibrator, the MC-2, designed for continuous or intermittent service on light duty applications such as bins, chutes and hoppers, has been introduced by Cleveland Vibrator Co.

The unit features an external mechanical air gap adjustment which changes vibration intensity with the turn of a bolt. According to the manufacturer this will vary intensity of vibration at a frequency of 3600 vibrations per minute. The body of the vibrator is of cast aluminum and attaches with two cast feet, eliminating the need for special mounting. It is equipped with a 6-ft. cord, on-off switch and ground wire. Dimensions of the base are 6-in. x 3-in., including the mounting feet. Height of the vibrator is 5-in.

MC-2 Electric Vibrator

Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio

For more details circle 143 on Enclosed Return Postal Card.

Portable Heater

A new portable heater that reportedly delivers heat within 3 seconds has been announced by Master Vibrator Co. The heater uses kerosene or No. 1 fuel oil, puts out 75,000 btu per hour in circulating warm air.

Portable Heater

Operation is controlled by plugging the heater in and out of any 115 volt electric outlet. There is no vent because the fuel is completely consumed. It will run 10 hours steadily, according to the manufacturer, and with a thermostat will run longer.

Master Vibrator Co., 1752 Stanley Ave. Dayton 1, Ohio

For more details circle 144 on Enclosed Return Postal Card.

Circular Slide Rule

Production on a circular slide rule for engineers and other plant and office executives has been started by the General Industries Co.

Simple calculations can be convenient and useful with the pocket-sized calculator. It will multiply, divide and find proportions.

General Industries Co., 1788J Montrose Ave., Chicago 13, Ill.

For more details circle 145 on Enclosed Return Postal Card.

Increase roadway and runway safety with Transite Underdrain Pipe

Eliminate the contributing causes of sags, holes and similar hazards to under-wheel safety with perforated Transite® Underdrain Pipe. Its superior performance in groundwater control has been proved in many county, state and federal installations.

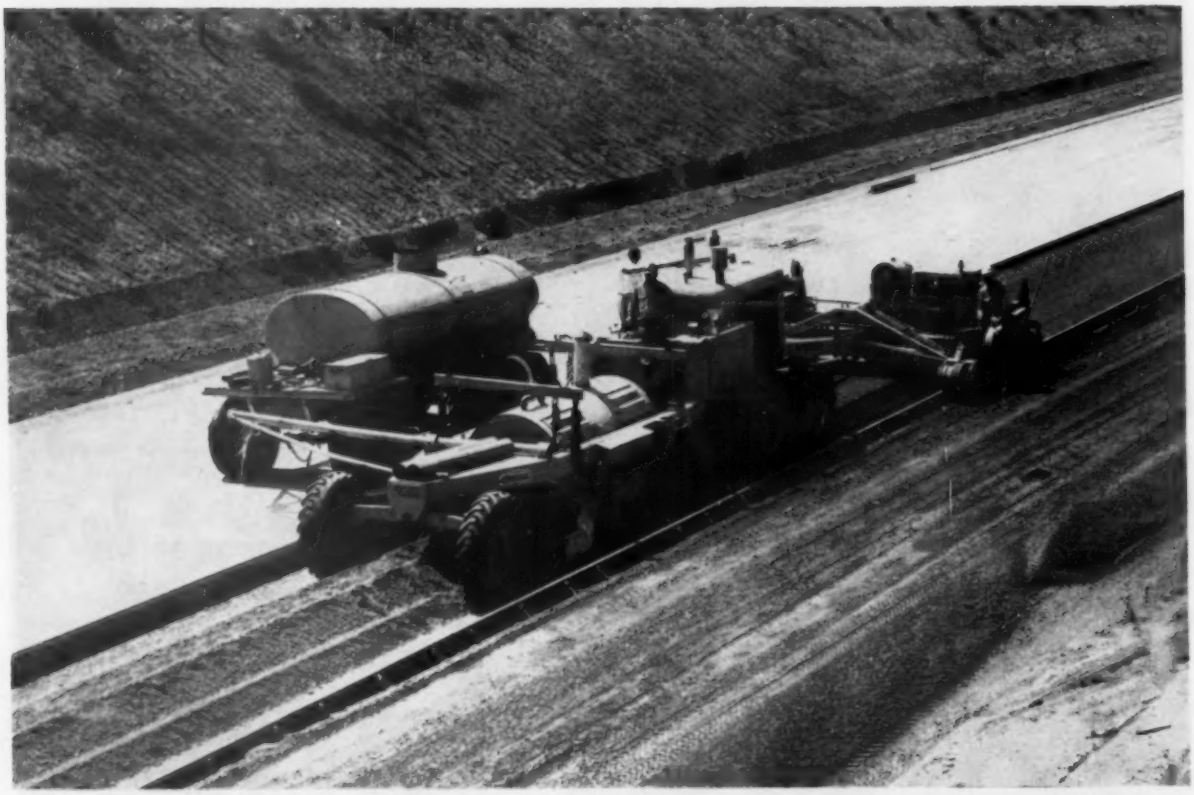
Transite Underdrain has an exceptional weight-to-strength ratio. The coupling, used to form the joints, assures a flexible yet reliably joined system. This, combined with long (10′ and 13′) lengths, keeps the pipe aligned and allows the line to ride with normal soil movement without disturbance to the system. Transite's smooth inner surface and low coefficient of friction assist the flow of water and reduce the opportunity for water-borne silt to build up on the invert. Thus, the accurately sized, drilled and located perforations can perform their function of letting groundwater into the line at a maximum flow rate.

● For full details, send for data sheet TR-246. Write to Johns-Manville, Box 362, RS-10, New York 16, N. Y. In Canada: Port Credit, Ontario. Cable address: Johnmanvil.

JOHNS-MANVILLE JM PRODUCTS

. . . for more details circle 312 on enclosed return postal card

Stationary plant quality...
Traveling plant economy!



PETTIBONE WOOD STABILIZATION MIXER
Mixes soil-cement at 550 tons per hour

The PETTIBONE WOOD Model 54-S Self-Propelled Stabilization Mixer produces up to 550 tons of soil-cement stabilized base per hour—with stationary plant quality!

The 54-S is PETTIBONE WOOD's answer to bigger-capacity production for the accelerated highway program. More than a mile of soil-cement road, or several blocks of soil-cement streets often are built in ONE DAY using PETTIBONE WOOD equipment.

One-man operated, the 54-S picks up aggregates cleanly off the subgrade, mixes it with binders in a 54" pugmill and lays it down in a uniformly mixed windrow ready for spreading. Electronic controls are available to maintain constant depth control.

Pettibone Wood stabilization equipment is used for highway, airport and parking lot construction the world over. Write today for free job studies and your copy of "The A B C's of Soil-Cement Stabilization", an informative, 36 page booklet on stabilization techniques.

PETTIBONE
A SUBSIDIARY OF PETTIBONE MULLIKEN CORP.
WOOD MFG. CO.

PETTIBONE WOOD MFG. CO.
P. O. BOX 620, NORTH HOLLYWOOD, CALIFORNIA
Originators of mix-in-place roadbuilding equipment

. . . for more details circle 326 on enclosed return postal card

Oil Filters

The new OFM Series oil filter with capacities up to 300 gpm are available from Vickers Incorporated, Division of Sperry Rand.

The filter is designed for two-stage filtration to trap and retain foreign particles over 8 to 10 microns in size. The two-stage filtration is achieved by

Two-Stage Oil Filter

using two layers of Alpha Cellulose. The outside layer is untreated and offers a pure absorbent surface. It filters out contaminants before the oil passes through the impregnated second layer. The filter provides full flow filtration at low rates of flow. At high flow rates, the increased pressure differential across the filter causes a poppet valve to open. This by-pass action directs a portion of the oil over the poppet where it rejoins that portion of oil directed through the filter element.

Vickers Incorporated, Division of Sperry Rand Corp., 18845 W. McNichols Rd., Detroit 19, Mich.

For more details circle 146 on Enclosed Return Postal Card.

Portable Pneumatic Cement Silo

A new portable pneumatic silo for storing and handling bulk cement delivered by pneumatic haulers has been announced by Engineered Equipment, Inc.

The standard basic unit has a 500 bbl fluffed rating and will transfer material at the rate of 250 bbls or 500 bbls per hour, depending upon the compressor and pneumatic accessories used with it. Called the Nomad, the unit is easy to erect and is self-supporting. No foundations are required. Available equipment provides flexibility in setup and operating techniques.

Engineered Equipment, Inc., Waterloo, Iowa

For more details circle 147 on Enclosed Return Postal Card.

Transmission for Mobile Equipment

Hydrostatic transmissions are now available for mobile equipment from the Watertown Div. of the New York Air Brake Co.

The Dynapower transmission consists of a variable displacement axial piston hydraulic pump which is coupled directly to the vehicles engine, and fixed displacement hydraulic motor which drives directly into the differential. High pressure hoses replace the conventional drive shaft, universals, gear changers and clutches. The speed and direction of rotation of the hydraulic motor are determined by the position of the pump's variable cam. Other combinations of single and dual, fixed and variable pumps and motors are available for applications having different performance requirements.

New York Air Brake Co., Starbuck Ave., Watertown, N. Y.

For more details circle 170 on Enclosed Return Postal Card.

Rectifier Welder

A new silicon dc rectifier welder, named the Lowboy, and designed for arc welding, cutting, or gouging has been announced by Hobart Bros. Co.

A single dial controls the welding range of the core-less and coil-less machine. The rectifiers are permanently sealed. A built in surge protector prevents the possibility of voltage pulses damaging the silicon rectifiers. It is available with 60 percent duty cycle ratings of either 200 or 300 amperes.

Hobart Bros. Co., Troy, Ohio

For more details circle 148 on Enclosed Return Postal Card.

Distance-Measuring Device

A one-man-operated measuring device that is reported to give fast and exact measurements is being manufactured by the B. G. Reilly Co. of Rhode Island.

Wheel-N-Measure Meter

The new machine can be used on foot, walking beside it, or from an auto moving at slow speeds. The meter, which is fixed to the frame near the wheel is 36-in. circumference. The tubular handle comes equipped with a soft rubber grip.

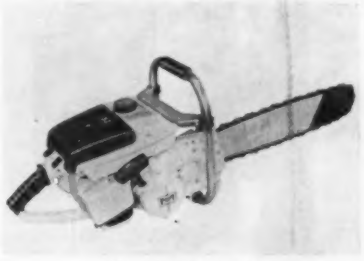
B. G. Reilly Co., P.O. Box 231, No. Scituate, R. I.

For more details circle 149 on Enclosed Return Postal Card.

Chain Saws

New power-increasing combustion chamber design, third port fuel induction system, efficient carburetion, fast starting and ease-of-operation are the main features reported in the new 1962 chain saws introduced by McCulloch International Inc.

McCulloch's 1/82, a typical example of a new line, has full gear drive power for both felling and bucking, 5.3 cu. in. piston displacement and 3.6:1 gear ratio. Wrap around handle frame, shock-mounted with rubber padded



McCulloch 1-82

handle grips and controls are standard. With all-position diaphragm carburetor, the unit weighs 24 pounds. A two-position "Town and Country" muffler for quieter operation is also standard.

McCulloch International Inc., 6101 W. Century Blvd., Los Angeles 45, Calif.

For more details circle 150 on Enclosed Return Postal Card.

Precision Bump Cutter

A new concrete cutting machine that reportedly removes preset and precise cuts from concrete surfaces, levels the surface to 1/8" in 16' to meet tolerance requirements, and at the same time leaves a non-skid surface has been introduced by Concut Sales, Inc.

According to the manufacturer the use of the bump cutter, called "Concut," can eliminate replacement of pavement that has buckled or heaved.

Concut Sales, Inc., P. O. Box 211, 1845 Belcroft Ave., El Monte, California

For more details circle 151 on Enclosed Return Postal Card.

FORNEY
CONCRETE TESTERS
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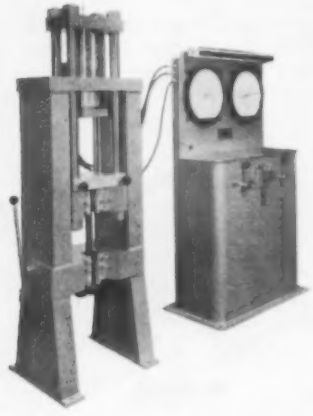
KNOWN THE WORLD OVER

MODEL LT-800
UNIVERSAL TESTER

Designed especially for the Construction Materials Laboratory



Capacity O — 250,000 lbs.

Standard Equipment includes:

- Gripper Blocks for Nos. 2 through 11 Reinforcing Bars
- Upper and Lower Platens for 6" x 12" Cylinders
- Automatic Safety Switch
- Power Control for Precise Adjustment of Rate of Loading

Extra Apparatus for Testing:

- Concrete Masonry Units
- Beams 6" x 6"
- Cubes 2" x 2" and 6" x 6"
- Bricks
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Model LT-800 is only one of a complete line of lowcost, top quality machines made and guaranteed by . . .

FORNEY'S, INC.
Tester Division
P. O. Box 310
New Castle, Pa., U.S.A.
Phone OLiver 2-6611
Cable: Forney's, New Castle

. . .for more details circle 298 on enclosed return postal card

Truck-Mounted Crane

A 12-ton capacity truck-mounted crane mounted on a 1066CX crane carrier chassis has been announced by Grove Crane Sales Co.

The boom telescopes hydraulically from 16-ft to 40-ft. under load with a maximum hook clearance of 44-ft. from the ground. The turntable winch, boom operator's station and counterweight rotate 360 degrees continuously. All movements of the crane unit are

Grove 12-Ton Truck-Mounted Crane

controlled by hydraulic valves at the operator's station. Attachments such as hydraulic calm-shells, jib booms, hydraulic hammers, snow scoops and others can be used.

Grove Crane Sales Co., Box 166, Windsor, Conn.

For more details circle 152 on Enclosed Return Postal Card.

Snow Wings

Omsteel Snow Wings are now available for conversion of Caterpillar wheel loaders into snow removal and plowing machines. Developed by the Omaha Steel Works the wing can be used to push high banks back or to clear road shoulders. It is controlled by two in-cab controls. One control raises and lowers the wing in level position; the other raises or lowers the

Snow Wings

outer end. Adjustment of the telescoping strut changes angle of attack. A removable cutting edge is adjustable to compensate for wear.

Omaha Steel Works, 609 S. 48th St., Omaha 6, Nebraska

For more details circle 153 on Enclosed Return Postal Card.

Flashing Warning Light

Powered by six 6-volt lantern-sized batteries, the new No. 675 Visi-Flash warning light produced by R. E. Dietz Co. delivers a 71 candlepower warning flash 65 times per minute for 4500 hours.

The new light is available with 10 different circuits, including a high-brightness neon tube circuit. The choice of low-drain transistorized circuits enables the warning light to meet any specifications. The 7-in. optical acrylic lenses include a reflex reflectorized lens band which provides 10 square inches of reflective lens area.

No. 675 Visi-Flash Warning Light

A die-cast, visored head allows each lens to float freely in separate lens tracks. The entire head can be swiveled 180-deg.

R. E. Dietz Co., 225 Wilkinson St., Syracuse 1, N.Y.

For more details circle 154 on Enclosed Return Postal Card.

Cantilever, Haunch Brackets

Two new products have recently been placed on the market by Symons Clamp and Mfg. Co. to assist contractors in concrete forming.

The first, the haunch bracket, is as its name implies, a bracket designed for use in pouring corbels, haunches or offsets. The plywood is tacked onto the bracket and brackets are connected with standard connecting hardware to Symons steel-ply forms. The second new Symons product is the cantilever bracket. The cantilever bracket supports the inside form work allowing the difference in form heights for a monolithic wall-slab pour.

Symons Clamp & Mfg. Co., 4249 Diversy Ave., Chicago 39, Ill.

For more details circle 155 on Enclosed Return Postal Card.

Scarifier Shanks

Addition of a line of alloy steel drop-forged motor grader scarifier shanks has been announced by Bucyrus Blades, Inc.

Through the drop-forging process, ForgeTemp quality shanks and tips are

Bucyrus Scarifier Shanks

produced with a very dense fibrous metal structure that imparts a high degree of resistance to abrasion and impact wear, reports the manufacturer.

Bucyrus Blades, Inc., Bucyrus, Ohio.

For more details circle 156 on Enclosed Return Postal Card.

Intermediate Crawler

The manufacture of the new International TD-15, 151 Series, crawler tractor, intermediate representative of the International-line crawlers, has been announced by the International Harvester Co.

Powered by a six-cylinder International D-554 diesel engine, the tractor develops 105 hp. at 1,650 rpm. Drawbar hp. is 85. The unit features built-in gasoline-conversion, push-button, all-weather starting of the four-cycle,

I-H Intermediate Crawler Tractor

valve-in-head type engine. A six-speed, full-reversing transmission with 6 speeds forward and 6 speeds in reverse is arranged for easy, single-stick shifting, according to IH. Forward speeds range from 1.5 to 5.9 mph. and reverse from 1.9 to 7.3 mph. Pressure-type cooling is teamed with a large-capacity radiator.

International-Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 157 on Enclosed Return Postal Card.

Concrete Release Agent

A new and effective release agent for use on concrete forms of all types has been announced by Edick Laboratories, Inc., manufacturers of chemicals for the concrete industry.

Known as Con-Treat, the new material is reported to prevent concrete from adhering to wood, fibre-board or steel forms. It is also said to be effective on mixers, trucks, scaffolding and wheelbarrows or similar equipment. Shipped in concentrated form, it is later mixed with low-cost fuel oil or kerosene as the user needs it. A 6-gal. can of Con-Treat makes 56 gal. of chemically active release agent. Application can be accomplished by hand or spray. Key to the new material is a special negatively-charged ingredient which forms a film to prevent adhesion. This allows forms to be re-used immediately.

Edick Laboratories, Inc., 2358 S. Burrell St., Milwaukee, Wis.

For more details circle 158 on Enclosed Return Postal Card.

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All-Weather, Instant-Use

KOTAL

Processed Bituminous

STOCKPILE MIX

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...for more details circle 314 on enclosed return postal card

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BARRETT DIVISION

Paving Materials Sales

Merchandise Mart
Chicago 54, Illinois

...for more details circle 277 on enclosed return postal card

Safety Snow Plow

An automatic trip edge snow plow has been designed by Balderson, Inc. The development is a spring-loaded trip cutting edge embodied in a line of reversible and one-way plows for trucks and Caterpillar wheel loaders.

When the cutting edge strikes an obstruction, it swings back and under the blade, letting the obstacle pass under without catching on the plow. The cutting edge then springs back into its original position. This safety feature allows the plow to "ride over" any hidden obstruction in the roadbed without damage to plow, injury to operator, or strain on the power unit. Because only the edges trip, rather than the entire plow, the load is maintained and valuable time is not lost.

Trip Edge Safety Snow Plow

Balderson Inc., Wamego, Kansas

For more details circle 159 on Enclosed Return Postal Card.

Portable Auger-Drill

The release of a new portable auger-drill has been announced by the General Metals Corp.

A 2½ hp. two-cycle engine with recoil starter and diaphragm carburetor makes the unit operatable in either a vertical or angle position. Maximum torque and adequate rpm are reported to permit a single operator to drill or auger holes from 1⅝ in. to 9 in. Replaceable cutting lips are made of rock drilling martempered alloy steel.

Portable Auger-Drill

General Metals Corp., Watertown, Wis.

For more details circle 160 on Enclosed Return Postal Card.

High Pressure Grease Gun

A new high pressure grease gun with a built-in light has been developed by Product Engineering Co.

Named the "LubriLite," the new gun makes it possible to save grease and time on hard-to-see lube fittings. A self-contained battery powered spot-light operates by the same short-stroke trigger that fires the lubricant. The light is battery operated. Because the work area is spot-lighted, the operator can see exactly where he's working and can tell precisely when enough grease has been used. The unit is enclosed in aluminum die-cast housing, with threaded connections and valve seats made of steel.

LubriLite

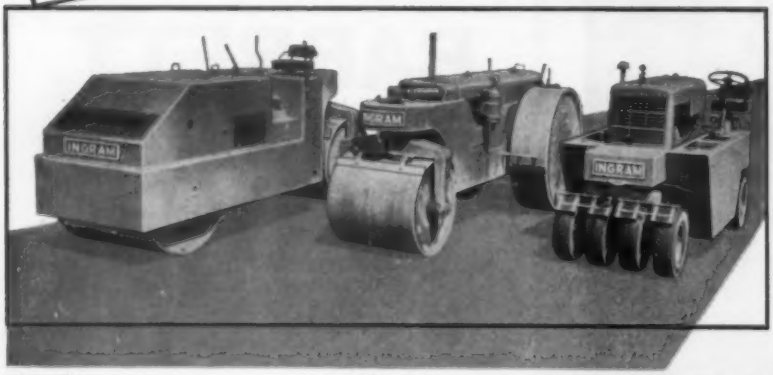
Product Engineering Co., 4707 S. E. 17th Ave., Portland 2, Oregon

For more details circle 161 on Enclosed Return Postal Card.

Reply By Circling Reference Number on Return Postal Card, Page 95

FOR RENT

It's Easy To Rent AN INGRAM



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It's easy and practical to rent an Ingram Roller. Your Ingram Roller distributor makes it easy to rent an Ingram by cutting red tape. No delays.

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KENNEDY'S

VAN BRUSH MFG. CO. INC.

2728 McGee Trfwy. Kansas City, Mo.

Fall Clearance Sale

The Following Equipment is in our yard, ready for immediate delivery, subject to prior sale.

1. INSLEY, "WT" 1958, Dragline Crane, 16' tracks, 36" shoes, GMC Diesel, 65 ft. of boom, 1¼ yd. drag bucket. Priced to sell at $37,500.00
2. INSLEY, "L" 1956, Dragline crane, completely rebuilt with six month guarantee. 30" shoes, Independent boom. Priced to sell at $14,500.00
3. INSLEY, "L" 1954, Trench Hoe Excavator, reconditioned with 30" shoes, new 38" bucket, Minneapolis-Moline 6-cyl. engine. Sale Price .....$ 9,500.00
4. INSLEY, "K-12" Dragline Crane, 24" shoes, 35' of boom, fairlead and drag bucket. In like new condition. A real bargain at....$12,500.00
5. INSLEY, "K-12" Dragline Crane, 1957, 24" shoes, 35' of boom, complete with fairlead and ½-yd. drag bucket. Priced to sell at.$ 9,500.00
6. INSLEY, "K-12" 1956 Dragline Crane, 18" shoes, long tracks, 35' of boom, Independent boom, brake type cab lock. Sale Price.$ 8,250.00
7. INSLEY, "K-12" 1955 Trench Hoe Excavator, Cat Diesel engine, 36" bucket, 24" shoes, 6800 lbs. counterweight. Priced to sell at.$ 9,500.00
8. INSLEY, "K-12" 1952 Trench Hoe Excavator, 18" shoes, long tracks, new style arched hoe boom. Reconditioned .....$ 6,750.00
9. INSLEY, "K-12" 1948 Trench Hoe Excavator, 24" shoes, long tracks, rebuilt engine. Priced to sell at.....$ 3,250.00
10. INSLEY, "K-12" 1947 Dragline Crane, complete with 30' of boom, fairlead and ¼-yd. drag bucket. Sale Priced at.....$ 3,500.00
11. INSLEY, "K-12" 1943, Dragline Crane, complete with 30' of boom, fairlead and 1⅛-yd. dragline bucket. Sale Priced at.....$ 2,250.00
12. AMERICAN, "275" 1957, Dragline Crane, complete with 40' of boom, fairlead and ¾-yd. drag bucket. Priced to sell at.$ 7,500.00
13. LORAIN, "50", 1950, Dragline Crane, complete with 30" shoes, 40' of boom, fairlead and 1-yd. Page Drag bucket. Priced to sell at .....$ 8,750.00
14. GENERAL, ¾-yd. Dragline Crane, complete with 40' of boom, fairlead and ⅝-yd. drag bucket. Priced to sell at.....$ 3,250.00
15. BAY CITY, Model "25" ½-yd. dragline crane, GMC Diesel engine, 30' of boom, fairlead, and ½-yd. drag bucket. Priced to sell at.$ 2,750.00
16. MICHIGAN, Model "75-D", ¾-yd. truck crane, complete with 30' of boom, fairlead and ⅝-yd. drag bucket. Priced to sell at.$ 2,750.00
17. INTERNATIONAL, Model TD-18A, 1952 Bulldozer, 10' straight cable blade, cab, double drum winch. In good condition. Priced to sell at .....$ 6,500.00
18. TOURNADOZER, 1951 Model "C", 11' tilt blade, 2100 tires, cab 671 GMC diesel with torqconverter. In good condition. Sale Price .....$ 9,750.00
19. TERRATRAC, 1955 Bulldozer, diesel engine. Complete with backhoe attachment. In good condition .....$ 3,750.00
20. JOHN DEERE, 1958 Model 420 crawler bulldozer, 5 roller track, angle blade. Cleaned and painted. In good condition.....$ 1,950.00
21. LeTOURNEAU, 11-15-yd. Rubber Tire Wagon .....$ 8,500.00
22. GALION, Model 101, Tandem road grader, International diesel engine, power steering. In good condition.....$ 2,750.00
23. LOWBOY Trailer, 35-Ton capacity, 9½' wide, 16' deck, air brakes, detachable gooseneck, tandem axle, 1400x20 tires.....$ 3,750.00
24. LOWBOY, Trailer, 20-Ton capacity, drop deck, air brakes, tandem axle, 825:20 tires, complete with Int. single axle tractor.$ 2,250.00

"The above equipment must be sold to make room for new trade-ins. No reasonable offers will be refused. Shop and compare, then buy and save at Vos."

For more detailed information on any item, please write or call us collect.

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1—D8 Ser. 14A540 with front push plate.
1—D8 Ser. 2U12051 with model 25 double drum power unit Ser. 9D16464.
1—D7 Ser. 3T12897 with dozer.
1—D4 Ser. 5T639 and dozer.
1—DW 10 Ser. 1V896 with scraper Ser. 3C1435.
1—Caterpillar model 80 pull scraper Ser. 5W710.
1—Allis-Chalmers Motor Grader model AD 4 Ser. AD4-2902.
1—LeTourneau "C" Tournapull Ser. CP40256, CPS-C complete with scraper.
1—LeTourneau scraper model FP Ser. S-27432-FP-C.

ANDERSON & BERTHELSEN CONSTRUCTION CO.
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CONTRACTOR's used equipment, priced to sell; very good to excellent condition: 122 yd. Johnson semi-automatic concrete batching plant ($10,000); 3,500 sq. ft. Economy steel forms for concrete walls ($5,000); 35,000 sq. ft. used Irvington standard all steel unit forms for concrete form work, excellent condition ($15,000); Littleford Kwik steam generator for pile driving ($5,000); Rome disc plowing harrow, model TMR 24-30 ($1,800); 10 ton, 3 wheel Huber roller ($3,250); 2 6-inch Moretrench wellpoint pumps with 600 ft. pipe main system and all accessories ($3,500); Northwest crawler crane, SN 12527 ($17,500); P & H crawler crane, with shovel front and backhoe attachments, model 855-B, SN 10984 ($15,500); 3 TD-24 bulldozers, SN 1914, 2024, 4266 ($6,500 to $8,000 each); contractor's field office trailers ($1,000 to $1,500 each); crane buckets, ¾ yd. to 2½ yd. (drag, clam and orange peel, etc.—various new prices); 2 1½ yd. Multi-Foote Pavers ($2,500 each); Gallon Motor Grader ($1,000); Adams motor grader ($1,000); Cement bulk tank trailer ($1,700); bulk cement car unloader ($1,750); HOUGH PAYLOADER, Model HMGC, gas engine & torque converter—2 yd. bucket, SN 92823C, 4 wheel drive on rubber ($5,000); 2 ¾ yd. Lorain shovel fronts ($1,250 each); BAY CITY ¾ yd. shovel front ($1,250); 1 ¾ yd. Lorain backhoe ($1,000); 2 2 yd. P&H shovel fronts ($2,500 & $3,000 each); 2 2yd. P&H backhoes ($1,500 & $2,000 each); Scheidt Stone Grapple, type 0-3 ($750); Federal No. 52A Sodmaster ($375); Clipper concrete saw, model C20 ($350); Cement Gunite machine ($875). Write P. O. Box 402, Barre, Vermont. Phone GRanite 6-4103.

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Final closing date is the Fifteenth of the preceding month. Magazine is issued 1st of publication month. If proof is desired, copy must be received 5 days preceding closing date

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1—S-12 Euclid Scraper, Serial 22499
1—99M Austin-Western Patrol with wing and plow, Serial 4942
1—Galion Model 102 Patrol
1—D-7 Cat Tractor, Serial 3T 26359
1—#70 Cat Scraper, Serial 3W5535
1—#12 Cat Patrol, Serial 7T 919
1—Ford Truck T 950 Tandem 1958 Model
1—D-8 Cat Tractor, Serial 2U 10768
1—255A P&H Dragline, Serial 8201
1—16S C.M.C. Mixer, Serial 125666
1—Backhoe attachment for ¾ Yd. Northwest
1—99M Austin-Western Patrol, Serial 4486
1—99 Gas Austin-Western Patrol
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2—20"x18" Eagle Portable Fine Material **Screw Washers,** Complete with Drives, less Wheels and Motor.
1—1½ to 2 Yd. **Slack Line,** 90 Ft. Sauerman Pole with Thomas Hoist, Complete with Blocks; 1½ Yd. Bucket; 100 HP, 440-Volt, Slip Ring Motor, Grids and Control.
1—1-Yd. **Slack Line,** 90 Ft. Sauerman Pole, Complete with Sauerman Hoist; Blocks; Cables; Trackline, and Bucket, less motor.
1—1½Yd. **Slack Line,** 100 Ft. Sauerman Pole, Complete with Blocks, Cable, Trackline, two speed Hoist, and 150 hp, 440 volt, two speed motor.

CONCRETE PLANT EQUIPMENT

1—1600 Bbl. Heltzel **Cement Bin** with Valves, scales and Batcher.
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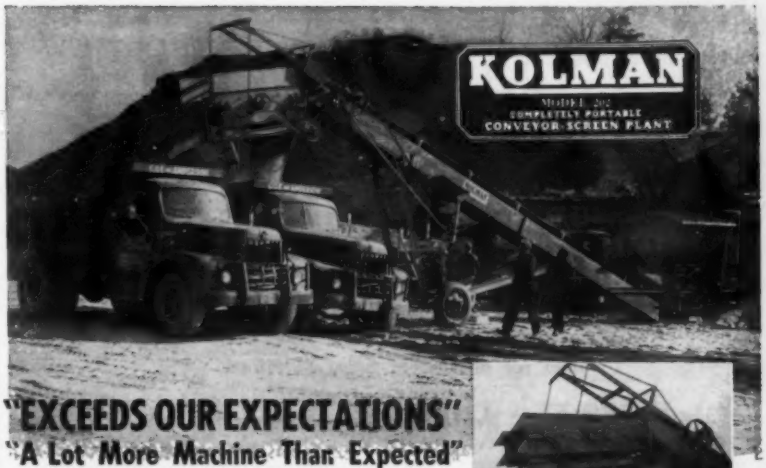

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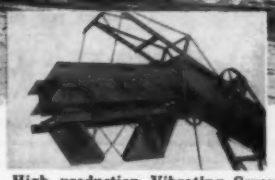

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650x20	8	16.50	
700x20	8	17.00	
750x20	10	17.50	
825.20	10	21.00	
900x20	10	24.00	
1000x20	12	26.00	
1100x20	12	30.00	
1100x22	12	35.00	
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H. K. Porter Company, Inc.
REFRACTORIES DIVISION
Attn. Clif. P. Schoemaker
Porter Bldg., Pittsburgh 19, Pa.

Manufacturers' Literature

STEEL FORMS FOR CONCRETE CONSTRUCTION: A 20-pg. catalog describing and illustrating a variety of construction projects on which EFCO steel forms might be suitable has been released by Economy Forms Corp., Box 128-AG, Highland Park Station, Des Moines, Iowa.

Projects discussed are curved walls, tapered walls, tunnels, columns, corbels and offsets as well as simple walls. Pictures of various sizes and styles of form panels, accessories, supplies and tools are shown.

For more details circle 162 on Enclosed Return Postal Card.

HARD HATS: The National Safety Council, 425 N. Michigan Ave., Chicago 11, Illinois has issued two pamphlets outlining the need for hard hats among construction workers, the advantages and established safety results recorded among hard hat wearers.

Offered are a series of campaign signs, posters, leaflets, and other literature for any manufacturer, or contractor who wishes to promote the wearing of the safety hat.

For more details circle 163 on Enclosed Return Postal Card.

ONE-PIECE BUCKET TOOTH: A new bulletin covering the one-piece Bucket Tooth, which is made of work hardening, Armor-Tough manganese steel, has been announced by Columbia Steel Casting Company, Inc., 933 N. W. Johnson, Portland 9, Oregon.

The bulletin, which gives complete details concerning this Columbia replacement part, includes all dimensions, weight, Columbia drawing number and metallurgical data.

For more details circle 164 on Enclosed Return Postal Card.

SOLIDS FLOW METER: A 2-pg. illustrated product specification sheet numbered, M22-6, and describing the operation of the Bailey Solids Flow Meter is available from Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio.

The specification sheet discusses the application of the meter for the measurement of granular materials such as coal, ore, and crushed rock in vertical ducts, spouts, or pipes. Minimum torque requirements for operation of counters and purging of surfaces, mechanical and electrical counters used with the meter and ranges of the counters are outlined.

For more details circle 165 on Enclosed Return Postal Card.

WHY A NEW MACHINE IS PROFITABLE: A 12-pg. booklet titled "Trade Up To More Profit" has been released by Caterpillar Tractor Co., Peoria, Ill.

The illustrated booklet cites owners' reports of 20 to 30 percent greater productivity of new machines over older models. According to the booklet such factors as higher horsepower, easier operation and maintenance and servicing help to do quality work faster and provide more job scheduling.

For more details circle 166 on Enclosed Return Postal Card.

BITUMULS FOR HOT-MIX PAVEMENTS: Laykold Asphaltic Concrete and Bit-u-mix bitumuls for hot-mix pavements are described in a 4-pg. folder from American Bitumuls & Asphalt Co., 320 Market St., San Francisco 20, Calif.

Laykold Asphaltic Concrete is normally specified where unusual durability and stability are desirable or required by traffic load; Bit-u-mix for paving in isolated areas where mass-handling facilities for hot asphalt are not available. This and other information is included in the folder.

For more details circle 167 on Enclosed Return Postal Card.

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With the Manufacturers

TRACTOR SHOVEL: A specification bulletin explaining the features of the model 254 Trojan tractor shovel has been released by the Trojan Division of Yale & Towne Mfg. Co., Batavia, New York.

Included are outlines concerning the machine's three interchangeable buckets, which give a carrying capacity of from 2 to 3 cu. yd., 7' 2" tread and 8' wheelbase which provides stability under difficult conditions and torque proportioning differential axles that permit maximum utilization of power.

For more details circle 165 on Enclosed Return Postal Card.

POWER UNITS FOR ASPHALT PLANTS: A description of power units and electric sets for crushing and asphalt plants are in a new 8-pg. catalog, No. BU-768, available from the Engine-Material Handling Division, Allis-Chalmers Mfg., Co., Milwaukee, Wisconsin.

The publication has pictures of various units, including the Thousand Series diesels, and shows important components of the engine and its combustion chamber. Tables of hp requirements of power units and electric sets along with photographs of the two units in action are included.

For more details circle 166 on Enclosed Return Postal Card.

DUSTY ROADS: A possible solution to roads that are topped with soil, slag, gravel or crushed stone and result in costly, irritating dust is discussed in a film entitled "Dust Costs Money," produced by Solvay Process Division, Allied Chemical Corp., 40 Rector St., New York 6, N.Y.

In the film calcium chloride is offered as a possible solution to the dust problem. The chemical reportedly draws moisture from the air and prevents road surfaces from drying out. This chemical treatment is said to be inexpensive in comparison to gravel replacement on roads.

For more details circle 167 on Enclosed Return Postal Card.

BUILD FORMS: A new booklet entitled "How To Build A Form" has been introduced by Symons Clamp & Mfg. Co., 4249 W. Diversey, Chicago 39, Ill.

The 12-pg. booklet combines a cartoon approach with actual in-plant photos in telling what it takes to make a form.

For more details circle 168 on Enclosed Return Postal Card.

POWER TOOLS: A revised 96-pg. catalog, describing the complete line of industrial power tools and accessories, has been issued by the Delta Power Tool Division, Rockwell Mfg., Co., 491 N. Lexington Ave., Pittsburgh 8, Pa.

Some of the industrial tools described are 20-in. and 17-in. power feed drill presses, a 12-in., cut-off machine and a 7-in. standard grinder. Complete specifications, catalog listings and descriptions of accessories are included.

For more details circle 169 on Enclosed Return Postal Card.

ALPHA BREAKS WITH DISCOUNT TRADITION: Long-standing cement industry discount policies have been jettisoned by a major producer, Alpha Portland Cement Co., Easton, Pa. The company announced new discounts and prices effective January 1, 1962.

The move makes Alpha the cement industry's first large producer to substantially revise discounts. Alpha's previous discount policy had been in effect more than 45 years. One of the nation's largest cement manufacturers, Alpha has assets of $59,000,000 and gross revenue of $43,650,000 annually. The new policy, says Alpha vice-president R. L. Rhodes, provides for a discount of 4 percent of the invoiced price when payment is made within 15 days of invoice. In most cases this will amount to a discount of 15 to 18 cents per barrel. The previous discount was 10 cents per barrel.

DIXIE FORM & STEEL CO.: Mr. H. P. Cerutti has joined the Dixie Form & Steel Co., of San Antonio, Texas as executive vice president and general manager of the firm. Mr. Cerutti was formerly with the Heavy Forms Department of Blaw-Knox Equipment Division as sales manager and chief products engineer.

Mr. Cerutti has designed forms for many of the country's largest concrete projects. He is a graduate of Carnegie Institute of Technology and served with the U.S. Army Corp. of Engineers during World War II.

MACK TRUCKS: Mr. Nicholas Dykstra was named president, chief executive officer, and director of Mack Trucks, Inc. Mr. Dykstra was formerly vice president of finance and director of McDonnell Aircraft Corporation. He was also an executive vice president of Curtiss-Wright, being with that company for 26 years.

GRANCO STEEL PRODUCTS CO.: The Chicago District Sales office of the Granco Co. has been moved to the Park Ridge Plaza Building, 101 S. Washington St., Park Ridge, Ill.

REMOVE SNOW FASTER
with MONARCH
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Don't delay! Now, before winter comes, install a Monarch Power Hydraulic Control on your snow removal equipment. Instant snow plow action—raise, hold or lower—right from the cab with the flick of the wrist. Thousands in use!

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...for more details circle 339 on enclosed return postal card

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ALLIED
JET SEAL 9015-J
chosen for the $27 million HOOD CANAL BRIDGE

Using the specially designed Allied-Stroud Applicator Model 1691-J, workman apply Allied Jet Seal 9015-J inside one of the giant pontoons of the Hood Canal Bridge.

Allied Jet Seal, Product 9015-J—the superior polysulfide, polymer, elastomeric sealant—was developed especially for sealing work on the new Hood Canal floating bridge near Seattle, Washington.

The floating portion of Hood Canal Bridge spans 6,470 feet of the bridge's total 7,866 foot length, and is composed of 23 concrete pontoons—most of them 360 feet long and weighing over ten million pounds each. These pontoons carry a Washington State highway twenty feet above the water.

Some 159,000 feet of 2½-inch stressed steel cables pass through bulkheads and endwalls in the underwater portions of the bridge. These cables are sealed to the giant pontoons with more than 4,000 gallons of Allied Jet Seal 9015-J.

Jet Seal 9015-J was selected for its complete and positive adhesion after immersion in water for long periods of time, and for its ability to meet high expansion and contraction factors.

Howard, Needles, Tammen and Bergendoff supervised construction for the Washington State Toll Bridge Authority. General contractor: Yuba Erectors Division of Yuba Consolidated Industries, Inc. Charles R. Watts Company, Seattle, was sealing contractor for the project.

For more information about Allied Jet Seal 9015-J and the complete Jet Seal story, write:

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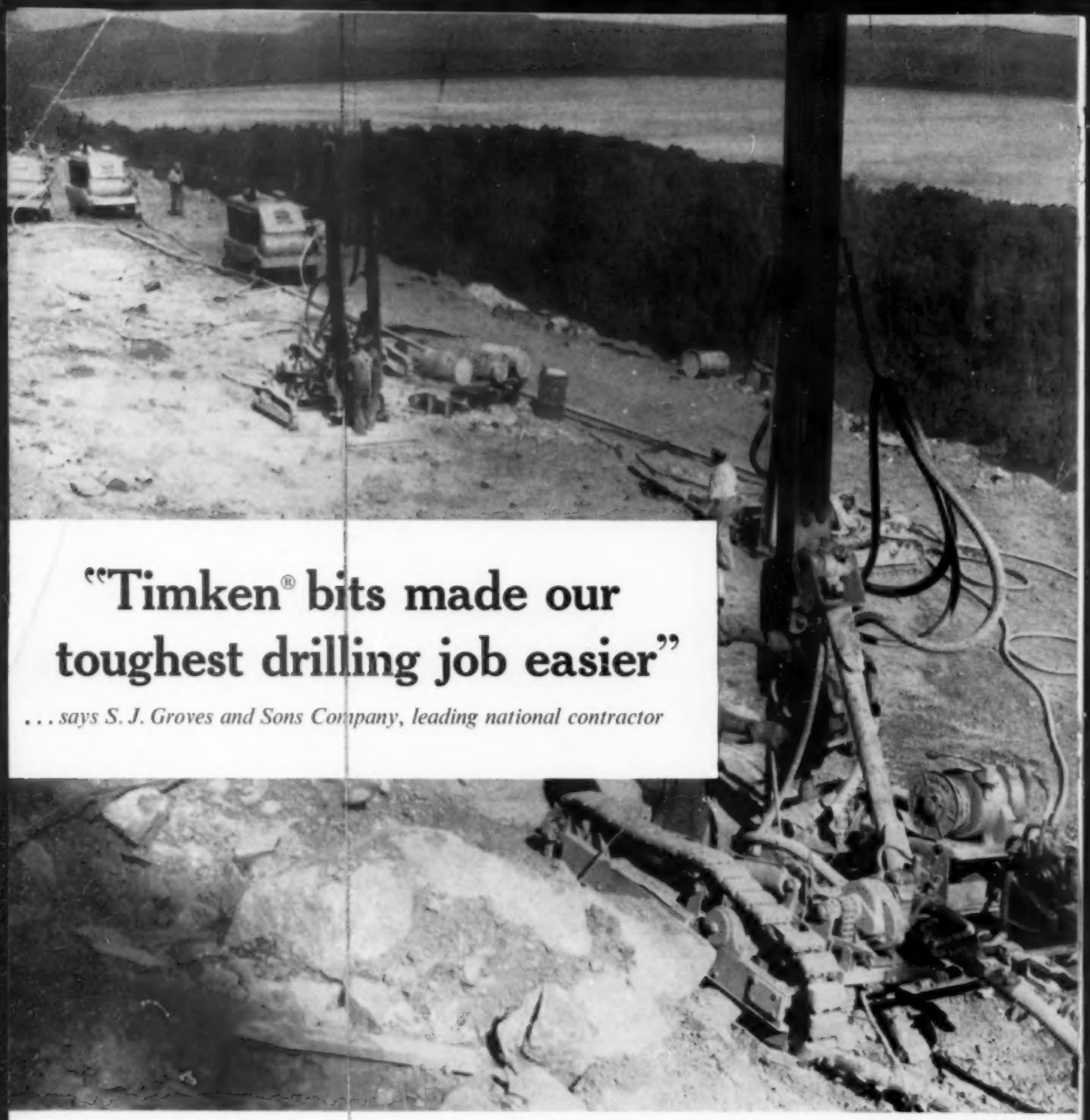

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One big reason Timken bits work so well is they have extra tough, special analysis carbide inserts. Another is their 5-front hole design, pioneered by the Timken Company which assures excellent hole cleaning. And on this remote job the helpful service of Timken rock bit engineers was an extra aid in getting the most from Timken bits.

On your jobs, use Timken carbide insert bits for greatest economy in hard, abrasive ground. In softer ground, use Timken all-steel multi-use bits. Both types fit the same drill steel. For the right Timken bit for your drilling, call our rock bit experts. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

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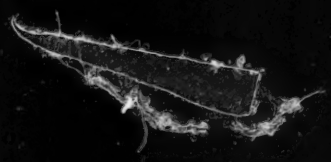
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